User Manual

SHRM03b

G.SHDSL.bis TDM Series 4U 19" Chassis

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SHRM03b TDM series 4U 19” Rack Mount Chassis

This manual supports the entire G.SHDSL.bis TDM Rack card family

SHRM03b-SH (shelf)
SHRM03b-PW (Power Module)
SHRM03b-PD ()
SHRM03b-FAN (Fan Assembly)

SHRM03b series TDM based G.SHDSL.bis Line card
SHRM03b-E1 (G.703 E1 card)
SHRM03b-V35 (Data Communications Card)
SHRM03b-ET100 (Ethernet Bridge Card)
SHRM03b-SNMP (Management Card)

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CISPR PUB.22 Class A COMPLIANCE:

This device complies with EMC directive of the European Community and meets or exceeds the following technical standard. EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.

CE NOTICE

Marking by the symbol CE indicates compliance of this equipment to the EMC and LVD directives of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards: EN 55022:2006, Class A, EN55024:1998+A1:2001+A2:2003, and EN60950-1:2001

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1 Introduction

This manual is used to explain the installation and operating procedures for the SHRM03b series Rack Mount, G.SHDSL.bis TDM Based Line Cards (SHRM03b, SHRM03b-E1, SHRM03b-V35, SHRM03b-ET100), NMS and present its capabilities and specifications.

The manual is divided into 4 Chapters with Appendix.

The first three chapters are the Introduction, Installation and Operation of TDM line card.

The last chapter is introduction and operation of NMS network management card.

The Appendix includes the pin assignments of special cables.

1.1 General Description

The SHRM03bB series is a 4U chassis that may be placed on a shelf or installed in either a 19" or 23" rack mount. All I/O connections and input power service are located on the rear of the chassis, while the line cards with LED status indicators and console connectors are installed in the front of the chassis. The power module for the SHRM03b series is including AC and DC input.

When AC input power is used, the AC power cord is directly connected to rear side of the power module, where it is rectified and regulated to 48VDC before routing to the backplane. When DC input power is used, the DC power cord is directly connected to rear side of the power module, where it is wire connect directly to the backplane.

There are 18 slots in the SHRM03b series chassis. Two slots are reserved for two power modules, one slot is reserved for the SNMP (Simple Network Management Protocol) card, which leaves 15 slots for Line Cards. There are four types of line cards currently available for the SHRM03b series: SHRM03b-E1 (E1 interface), SHRM03b-V35 (Data interface), SHRM03b-ET100 (Ethernet interface) and SHRM03b-T1(T1 interface).

Each line cards can use with two modes selection: 2-wire mode(2 channel per card) and 4-wire mode (1 channel per card).

SHRM03bB series TDM line cards are based on TDM and can be

interconnected at the other SHDTU03b series TDM based standalone NTU.

Without the SNMP card, configuration and monitoring can performed via RS-232 console ports located on each individual line card.

1.2 General Features

- Standard G.SHDSL.Bis ITU G.991.2 (2004) supports improved reach/speed and greater interoperability
- Fast and cost-effective provisioning of traditional frame relay (FR or T-HDLC) or TDM leased line services
- User existing copper loop infrastructures
- SHRM03bB series line card can support up to two channels, each channel utilizes one pair (two-wire mode) for DSL or one channel utilizes two pair (four-wire mode) for DSL
- With using single-pair (2-wire) operation for per channels, uses only one pair with a maximum user data rate of 5.696Mbps for symmetric payload rates over exiting copper wire
- With using two-pairs (4-wires) operation , uses single channel with a maximum user data rate of 11.392Mbps for symmetric payload rates over exiting copper wires
- One console port on the front panel of each line card
- Bandwidth guaranteed transmission equipment
- Remote line loopback
- SHDSL Line and E1/T1 performance monitoring
- Raw and per time interval statistics
- Wetting current to protect SHDSL line
- Menu oriented craft screens for ease of use
- Downloadable software for easy upgrade
- Central solution in standard 19 inch or 23 inch rack
- High density and compact and 4U high
- Hot swapping of cards
- Up to 15 cards can be installed
- Optional SNMP network management system card
- Optional EMS management system (software)
- Different power source option , AC or DC
- Redundant AC or DC power supplies (optional)

1.3 General Specifications

WAN Interface

- Line Rate: ITU G.991.2 (2004)
- Coding: trellis coded pulse amplitude modulation (TC-PAM16 and TC-PAM32)
- Support: Annex A ,B , F and G
- Payload rates: 64Kps to 5.696Mbps (N=1 to 89) for 2-wires operation
  128Kbps to11.392Mbps (N=2 to 178) for 4-wires operation
- Impedance: 135 ohms

G.703 Interface (as E1)

- Connection: RJ-48C for balanced 120Ω E1 cable and BNC for unbalanced 75Ω E1 cable
- Line Rate : 2048KHz +/- 50ppm
- Line code: HDB3/AMI
- Framing : PCM30/PCM30C/PCM31/PCM31C and Unframed
- Data Rate : 64Kbps to 2.048Mbps (Nx64Kbps , N=1 to 32)
- Operation : Full E1 and Fractional E1

Serial Interface (as RS-530/V.35/X.21)

- Connector : DB-25 female for V.35 cable
- Payload rates: Up to 5.696Mbps(for 2-wire model) or Up to 8.192Mbps(for 4-wire model)
- Support V.35/RS-530 or V.36/X.21

LAN Interface (as Ethernet)

- Connector : RJ-45 Ethernet Interface
- 10/100Mpbs Half/Full Duplex, Auto-sensing, Auto-Crossover
- Up to 1024 MAC address learning, filtering bridge

G.703 Interface (as T1)

- Connection: RJ-48C for balanced 100Ω T1 cable
- Line Rate : 1544KHz +/- 50ppm
- Line code: B8ZS
- Framing: SF/ESF/Unframed
- Data Rate : 64kbps to 1.536Mbps (N=1 to 24)
- Operation : Clear Channel and Factional T1

DSL Timing

- Internal
- From E1/T1 Recovery
- From DTE (as V.35 and Ethernet)

Performance Monitoring

- ES, SES, UAS, LOWS for SHDSL.Bis
- ES, SES, UAS for E1
- Alarms and Errors for SHDSL.Bis or interface

Loopback Tests (for E1 and V.35 interface only)

- Local Digital Loopback
- Local Loopback
- Remote Line Loopback
- Remote Payload Loopback
- Far-end Line Loopback
- Far-end Payload Loopback
- V.54 Loopback (for V.35 interface)
- Build-in 2047(2^{11}-1) bit BER tester

Indicators

- Power : PWR
- System : SYS
- SHDSL.bis Link : SHDSL
- E1/T1 Interface status : LOS , LOF , AIS
- V.35 Interface status : TD , RD , CTS
- Ethernet Interface status : LINK/ACT , 100M , DUPX
- Diagnostic status : TEST
- Error status : ERROR
- Alarm Status : ALARM

Console ports

- One console ports on front panel for each cards

Product's information

Model Number	Description
SHRM03b-SH	4U 19" 18 Slot Chassis only
SHRM03b-SH-PW	4U 19" 18 Slot Chassis with one AC+DC power

	card
SHRM03b-SH-PD	4U 19" 18 Slot Chassis with one DC power card
SHRM03b-PW	AC 100~ 240V + DC 36 ~72 V Power Card
SHRM03b-PD	DC 36 ~72 V Power Card
SHRM03b-FAN	Fan module
SHRM03b-SNMP	SNMP card
SHRM03b-E1	SHDSL Bis TDM 2W 2Ch / 4W 1CH E1 card
SHRM03b-V35	SHDSL Bis TDM 2W 2Ch / 4W 1CH V.35 card
SHRM03b-ET100	SHDSL Bis TDM 2W 2Ch / 4W 1CH ETHERNET card
SHRM03b-T1	SHDSL Bis TDM 2W 2Ch / 4W 1CH T1 card

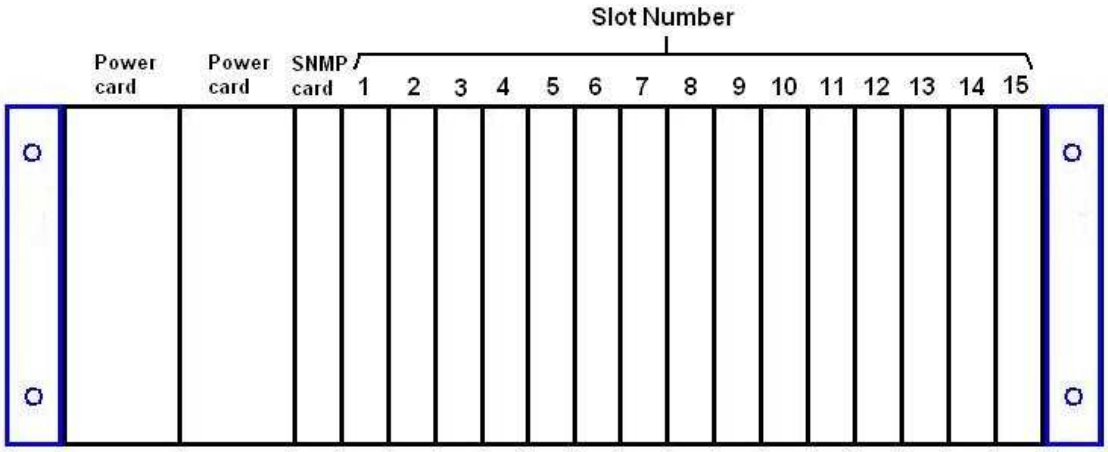
Default Username and Password:

System	User Name	Password	IP
SNMP(WEB)	root	root	192.168.0.1
SNMP(Telnet)	admin	(not need)	192.168.0.1
SNMP(Console)	cli	cli	----------
Line card (Console)	admin	admin	----------

1.4 Front Panel

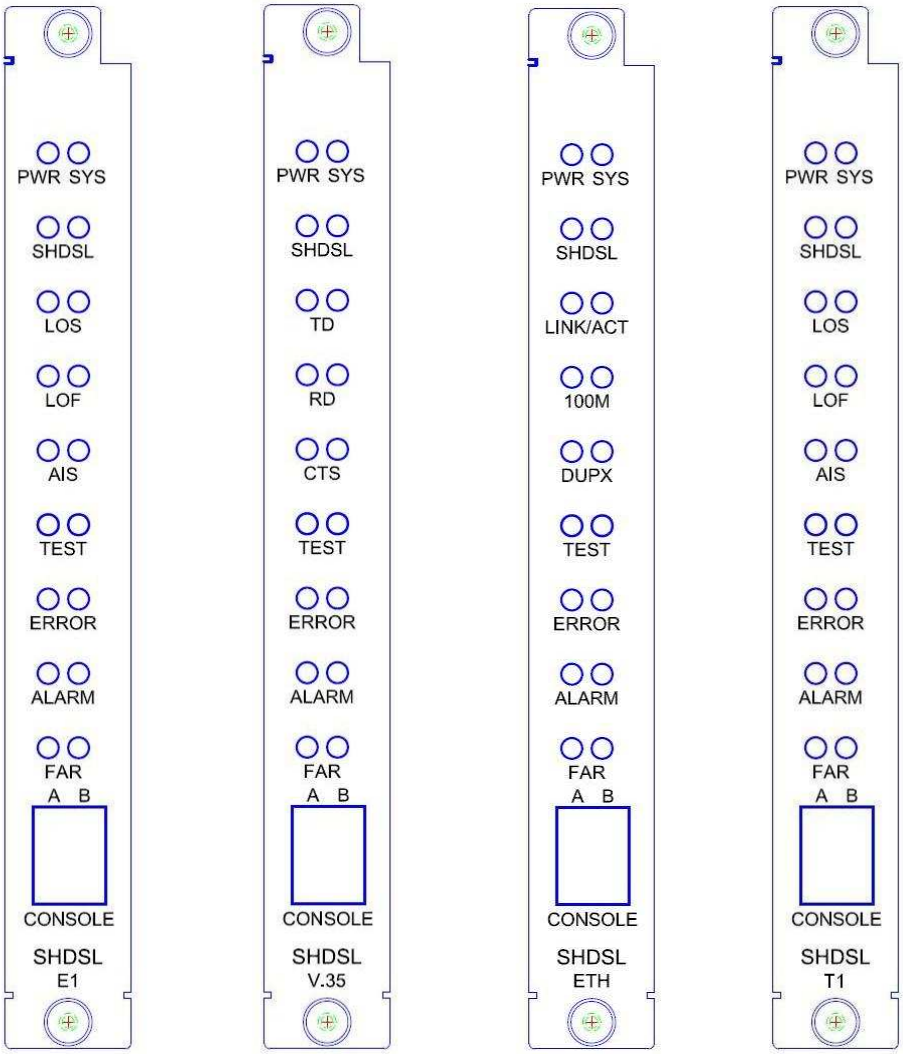
1.4.1 Slot Number

Each slot will have a number from 1 to 15 indicating the slot number location of the right-top side of each line cards. From the front view of the chassis, the numbers go from left to right.



1.4.2 Line card

1.4.2.1 View of Front Panel on Line Card



SHRM03bB **SHRM03b-V35** **SHRM03b-ET100** **SHRM03b-T1**

E1 interface V.35 interface Ethernet interface T1 interface

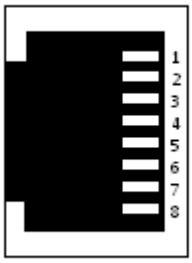
1.4.2.2 LED Indicators

LEDs status of TDM SHDSL.bis Line Card:

Items	LEDs	Color	Active	Description
Power	PWR	Green	On	Power supply is connected
System	SYS	Green	flash	The system is working
SHDSL.bis Link	SHDSL	Green	On	SHDSL.bis line connection is established
			Blink	SHDSL.bis handshake
			Off	SHDSL.bis line connection is dropped
E1/T1 Interface status	LOS	Red	On	LOS status is On
			Off	LOS status is Off
	LOF	Red	On	LOF status is On
			Off	LOF status is Off
	AIS	Red	On	AIS status is On
			Off	AIS status is Off
V.35 Interface status	TD	Green	Blink	Transmit data in V.35
			Off	No data transmit in V.35
	RD	Green	Blink	Received data in V.35
			Off	No data received in V.35
	CTS	Green	On	CTS signal is On
			Off	CTS signal is Off
Ethernet Interface status	LINK/ACT	Green	On	LAN port connected
			Blink	Transmit or received data over Ethernet
			Off	LAN port is disconnected
	100M	Green	On	LAN port connect with 100M NIC
			Off	LAN port acts in 100M
	DUPX	Green	On	LAN port is Duplex mode
			Off	LAN port isn't duplex mode
Diagnostic Status	TEST	Yellow	On	System is testing for connection
			Off	System is working normally
Error Status	ERROR	Red	Blink	Error second occurs
			Off	No error second
Alarm Status	ALARM	Red	On	SHDSL.bis line connection is dropped E1/T1 connection is dropped
			Off	No alarm status
	FAR	Yellow	Off	No used

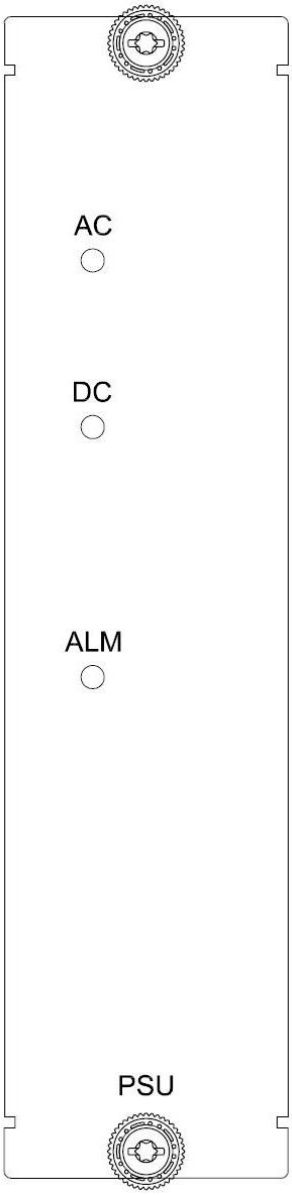
1.4.2.3 Console Connector

The front panel of each line card provides an RJ-45 connector for configuration, individually from each channel of each line cards. The terminal settings are 115200, 8 bit, no parity, 1 stop bit and no flow control.



1.4.3 Power Supply Module

1.4.3.1 View of Front Panel on Power Supply Module



1.4.3.2 LED Indicators

LED status of Power Supply Module:

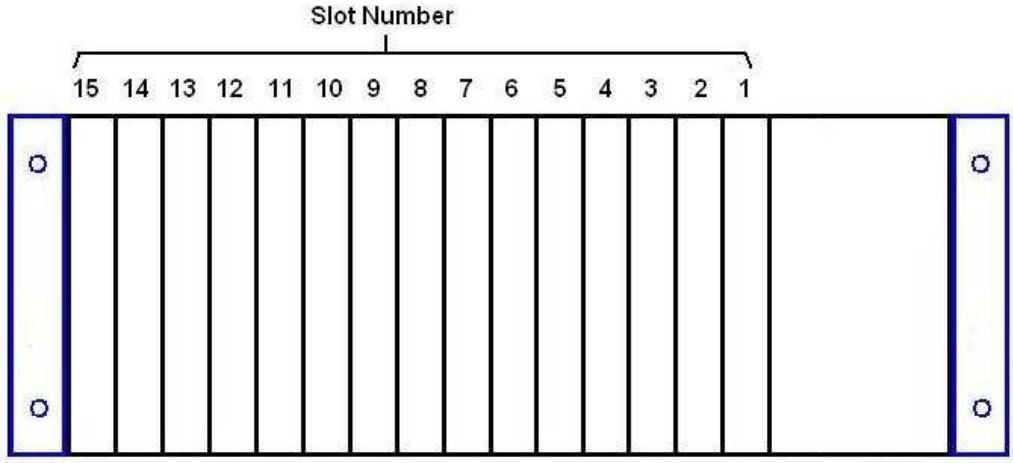
LEDs	Active	Description
AC	On	AC input is be used
	Off	AC input isn't be used or no AC input
DC	On	DC input is be used
	Off	DC input isn't be used or no DC

		input
ALM	On	Power input failure

1.5 Rear Panel

1.5.1 Slot Number

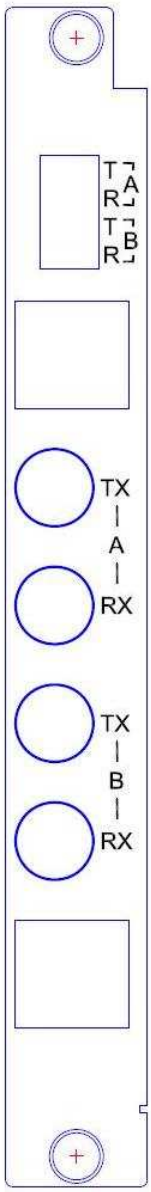
Each slot will have a number from 1 to 15 indicating the slot number location of the right-top side of rear penal of each line card. From the rear view of the chassis, the numbers go from right to left.

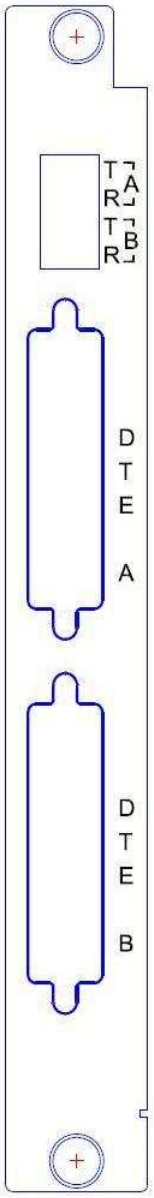


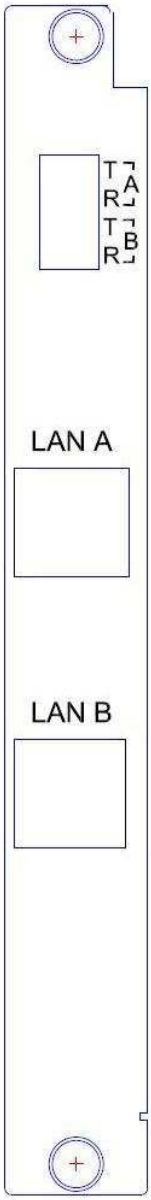
1.5.2 View of Rear Panel on Line card

The rear panel provides all of the data connections for each line card. A total of 15 slots are available for SHDSL.bis TDM based Line Card.

The following is a description of all the connectors for the line cards located on the rear panel.







SHRM03b E1 Interface **SHRM03b-T1 T1 Interface**

SHRM03b-V35 V.35 Interface

SHRM03b-ET100 Ethernet Interface

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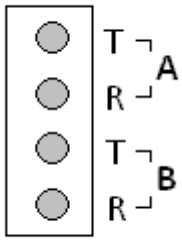
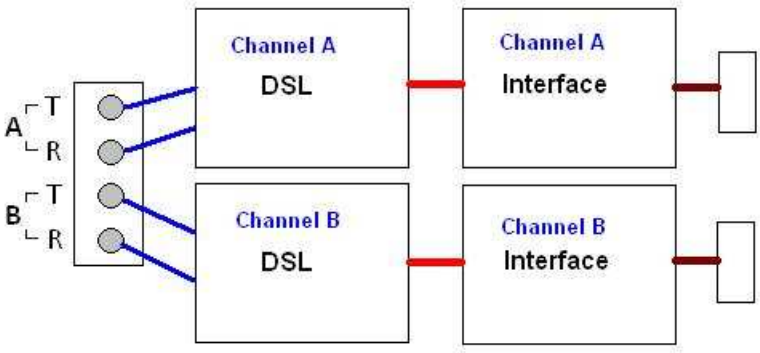
1.5.2.1 DSL connector

Use 4 pins wire wrap pin header provided the DSL twisted pair wire connect to the remote CPE device.

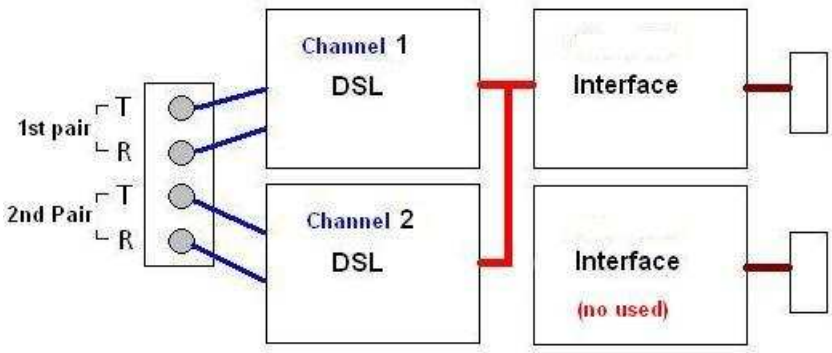


2-wire mode (2 channel per card)



When using 2-wires(One pair) mode, there are two pins labeled T (Tip) and R (Ring) on channel A and channel B.

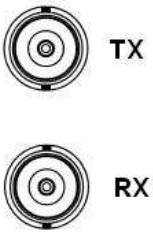
4-wire mode (1 channel per card)

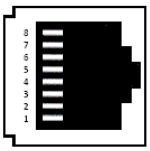


When using 4-wires(Two pair) mode, the label A and B means 1st pair and 2nd pair of DSL wiring.

1.5.2.2 E1 Interface Connector

User can using one of the connector type of the following.





75 Ohms
BNC Connector

120 Ohms
RJ-48C Connector

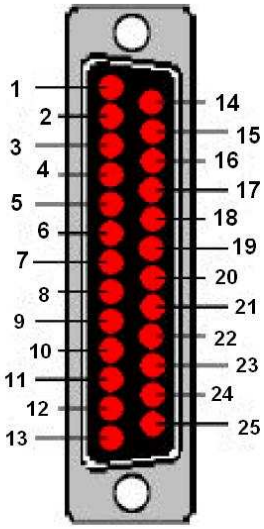
The internal wiring between BNC sockets and RJ-48C:

Signal Name	BNC Connecters	RJ-48C Connector
Transmit Tip	Center pin of Tx Connector	5
Transmit Ring	Shield of Tx Connector	4
Receive Tip	Center pin of Rx Connector	2
Receive Ring	Shield of Rx Connector	1

It is support dual jacks of BNC (75 ohms) and RJ-45(120 ohms).

When using 4-wire(2 pairs) mode, only the upper side of E1/T1 connector can be used.

1.5.2.3 Serial Interface connector



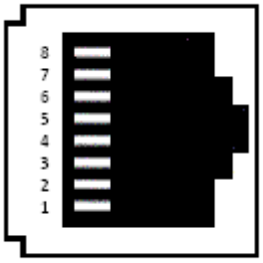
DB-25(F) Connector

On the rear panel of serial Interface Line card, there have two DB-25 female connectors provides serial interface connections for channel A (on upper side) and channel B (on below side).
When using 4-wire(2 pairs) mode, only the upper side of DB-25(F) connector can be used.
If the DTE (Data Terminal Equipment) connector is using 34-pin Winchester type, we must use the cable adaptor from DB-25 to Winchester (M.34).

If there is X.21 application, we must use the DB-25 to DB-15 adaptor cable.

When using 4-wire(2 pairs) mode, only the upper side of DB-25(F) connector can be used.

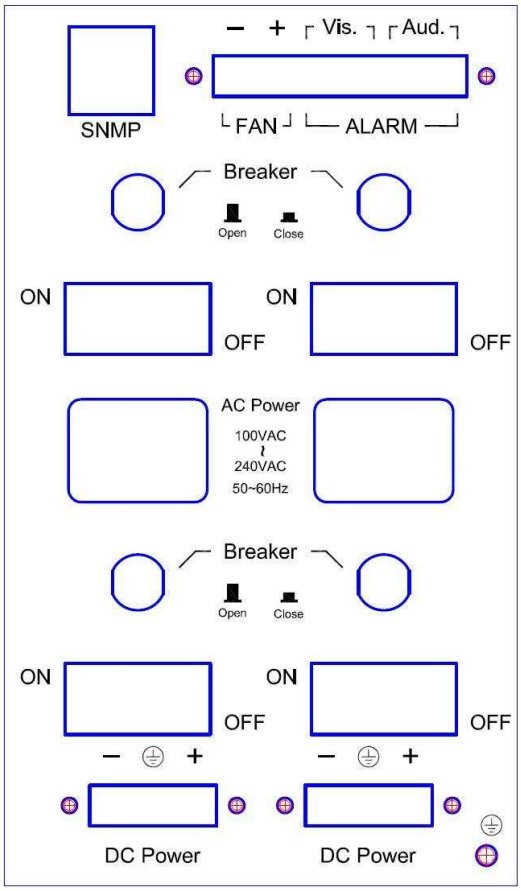
1.5.2.4 Ethernet Interface connector:



On the rear panel of Ethernet Interface Line card, there have two RJ-45 connectors provides standard Ethernet connections for channel A (on upper side) and channel B (on below side).

When using 4-wire(2 pairs) mode, only the upper side of RJ-45 connector can be used.

1.5.3 View of Rear Panel on Power Supply Module



The power modules can be using on AC or DC operation, as the chassis backplane is designed for -48VDC direct connection to central office power.

1.5.3.1 Power receptacle

This is an IEC Connector. To connect the AC power to the chassis, insert the female end of power card to the power receptacle on the rear panel. Connect the other end of the supplied power card to a 100~240V AC power outlet.

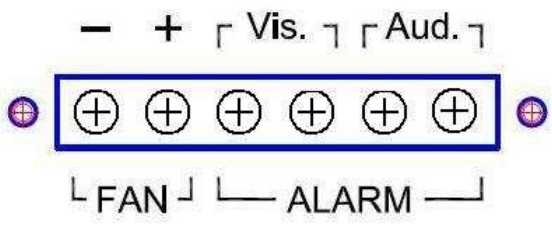
1.5.3.2 Power Switch

There have two power switches which control for AC and DC power input.

1.5.3.3 Breaker

The circuit breakers provide over current protection for AC or DC inputs. They are resettable by pushing back to the closed position.

1.5.3.4 Terminal Block connector



There have two alarm connectors (Vis. Alarm and Aud. Alarm) for TDM based line card.
The DC output terminal strip provides hard wired connections for DC power (-48VDC) to
the FAN modules.
The size of the screws in the terminal block is M3.0.

1.5.3.5 DC Power input connector

This terminal strip provides hard wired connections for DC power (48VDC) to the power service input.

WARNING!:
Proper polarity must be observed for DC power connections or severe electrical damage may occur to the chassis. Always confirm the polarity with a voltage meter before inserting line cards or powering on the mains switches.

2 Installation

2.1 General

The Installation chapter will cover the physical installation of the SHRM03b series, the electrical connections, line card installation and cabling requirements. A brief overview of the functional components such as power modules, line cards and management options will also be outlined in this chapter.

Required Tools

You will need these tools to install the SHRM03b series Rack Mount:

- Phillips screw driver for chassis installation screws.
- Wrist strap or other personal grounding device to prevent ESD occurrences.
- Antistatic mat or antistatic foam to set the equipment on.

2.2 Unpacking

Step 1. Inspect the outside carton for any shipping damage and report immediately to your freight forwarder if any damage is visible.

Step 2. Place the shipping carton with the top facing up. Carefully cut through the shipping tape with a box cutter knife.

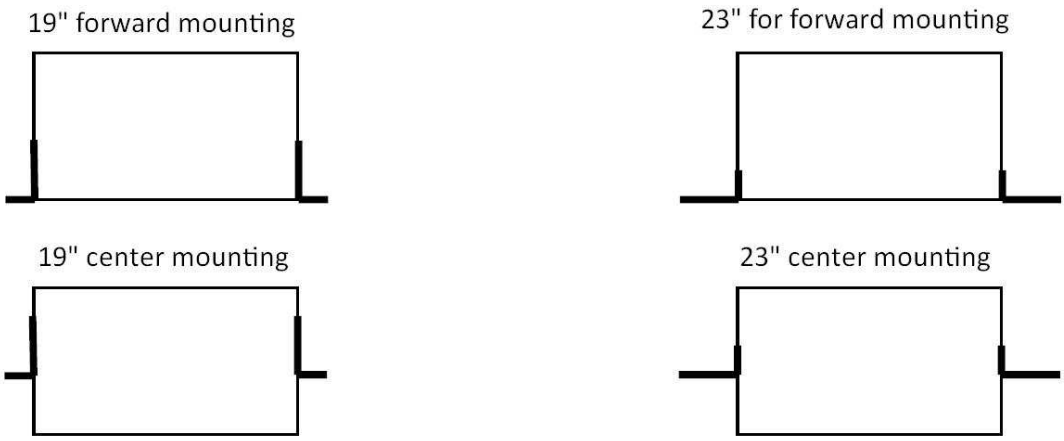
Step 3. Open the top cover of the carton and remove any pizza box.

Step 4. Pull the entire chassis straight up out of the carton

Step 5. The chassis should be wrapped in a plastic bag. Remove the chassis from the plastic bag. Set the chassis on a secure flat surface and again inspect for any shipping damage. Report any damage immediately to your freight forwarder.

2.3 Installation with Rack

The rack mount brackets that ship with the SHRM03b series chassis allow mounting in either 19" or 23" wide rack spaces. A total of four different mounting configurations are possible. Please see the chassis top view graphics below.



Chassis Mounting Options

2.3.1 Attaching the Mounting Brackets

Step 1. Place the supplied rack- mounting bracket on one side of chassis ensuring the mounting holes on the chassis line up to the mounting holes on the rack mounting bracket.

Step 2. Insert the supplied screws (M3X4 flat head screws) into the rack mounting holes and tighten with a screwdriver.

Precautions: Only M3X4 flat head screws can be used, failure to use the proper screws may damage the unit.

Step 3. Repeat the process for the rack-mounting bracket on the other side of the chassis.

Step 4. You may now mount the chassis on a rack. Proceed to the next section.

2.3.2 Mounting the chassis on a Rack

Precautions:

(a) Make sure the rack will safely support the combined weight of all the equipment it contains.

(b) Make sure the position of the chassis doesn't make the rack unstable or top-heavy. Take all necessary precautions to anchor the rack securely before installing the unit.

(c) For proper ventilation, ensure the air flow around the front, sides, and back of the chassis is not restricted.

(d) Do not install the chassis in an environment where the operation ambient

temperature might exceed 45˚C.

Step 1. Insert the chassis into the 19-inch or 23-inch rack ensuring the rack-mounting holes on the chassis line up to the mounting hole on the rack.
Step 2. Secure the chassis to the rack with the supplied rack screws. Fasten the lower pair of screws before the upper pair of screws. This ensures that the weight of the unit is evenly distributed during installation. Ensure that the ventilation holes are not obstructed.

It is recommended that the SHRM03b chassis be mounted into the rack cabinet prior to installing any required power modules and line cards. Without cards, the chassis is light weight and can easily be installed by a single person.

WARNING: A fully loaded chassis can be quite heavy and unbalanced. Dropping a fully loaded chassis would result in severe damage to the chassis and line cards, as well has pose a serious safety hazard resulting in bodily injury to the installation personnel. Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

2.3.3 AC power Connection

To connect the AC power supply is perform the following:

1. Using the supplied standard power cable with safety grounding connector, connect the power cable to the AC main socket located on the back panel.
2. Connect the power cable to a grounded AC outlet.
3. Confirm that the device is connected and operating by checking that the Power Supply LED(AC) on the front panel is green.

The chassis can use dual power supply modules for redundant power system

2.3.4 DC Power Connection

To connect the DC power supply is perform the following:

1. Remove the plastic cover on the terminal block.
2. Loosen the two screws marked "-48V" and "PWR GND", so that you can slide the DC cable beneath it. Insert the DC cable into the connector first, and screw it down tight.

3. Connect the power cable to the DC power supply.
4. Confirm that the chassis is connected and operating by checking that the Power Supply LED(DC) on the front panel is green.

WARNING: Before connect the DC power cable to the input terminal block of rear panel, ensure that the power switch in the "OFF" position and the DC power is OFF.
NOTE: A qualified electrician must perform all connections to DC power and to safety grounds. All electrical wiring must comply with applicable local or national codes and practices.

2.4 Line Card Removal / Replacement

This section will explain how to install and remove SHDSL.bis Line Cards.

2.4.1 Installing a Line Card

Use the following procedure to install a SHDSL.bis Line Card in the main chassis.

Step 1. Using either an anti-static grounded wrist strap or touching a grounded metal frame, remove the line card from its anti-static protective bag by grasping the metal panel. Do not touch the PCB or components on the PCB.

Step 2. While still grasping the center of the front panel of the card with one hand, place the other hand under the card to support it.

Step 3. Slide the Line Card into the slot until it makes contact with the backplane.

Step 4. Gently press the card the remaining way into the backplane connector until fully seated.

Step 5. Tighten the two thumbscrews by hand.

2.4.2 Removing a Line Card

Use the following procedure to remove a SHDSL.bis Line Card from the main chassis.

Step 1. Using either an anti-static ground wrist strap or by touching a grounded metal frame, loosen the two thumbscrews, using a flat blade screwdriver if necessary. Do not remove the screws completely.

Step 2. Grasp the line card by the captive thumbscrews and pull evenly on both to release the backplane connectors.

Step 3. After you have the card partially out of the chassis, place one hand under the card to support it.

Step 4. Slide the card completely out of the slot and place in an anti-static protective bag.

3 Operation

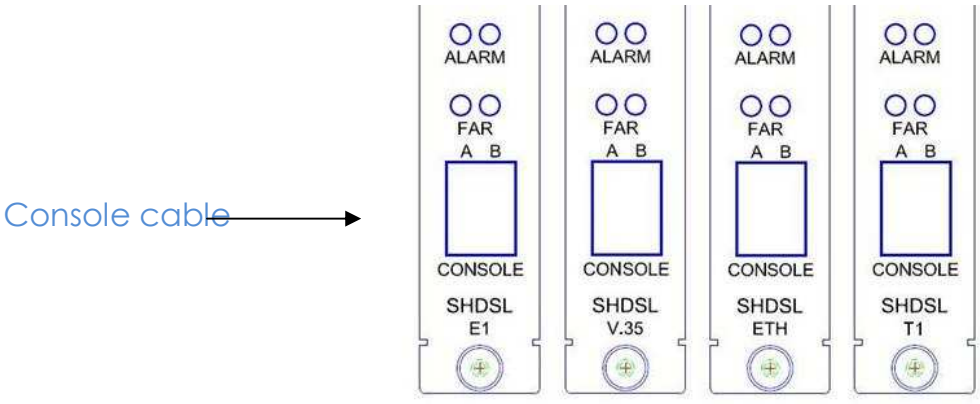
This chapter will deal with the specifics of configuration and operation of all aspects of the SHRM03bB Line card series (including SHRM03bB, SHRM03b-V35, SHRM03b-ET100 and SHRM03b-T1)from individual line card configuration, management options and typical application examples and settings.

Configuration and operation of this product via console port with terminal emulation program. The configuration of the TDM base SHDSL.bis Line cards is performed via a menu-driven embedded software, using a standard ASCII terminal or a PC running a terminal emulation application connected to the front panel CONSOLE port.

Windows includes a terminal emulation program called HyperTerminal. Connect the appropriated communication port from the PC to this device. After the physical connection is made, you are ready to configure this product. Make sure you have connected the supplied RS-232C serial cable (DB9F to RJ-45 Plug) to the console port on the rear panel of this product.

3.1 Login Procedure

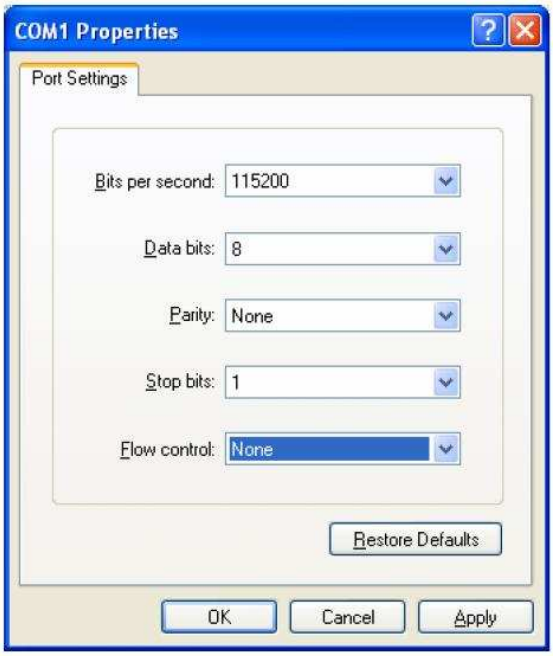
Check the connectivity of the RS-232 cable from your computer to the serial port of line card.



Run the terminal emulation program such as Hyper Terminal with the following setting:

Emulation: VT-100 compatible

Band rate: 115200, Data bits: 8, Parity: None, Stop Bits: 1, Flow Control: None



At the start up screen, you will see:

```
DownLoad FPGA Code 0000fb6c/0000fb6c...Ok
SHDSL.bis (T1) Interface, STU_C_INTCLK Mode, STU_C_INTCLK Mode
Model = 3030B  Software Version = 1.14.04  FPGA Version = 0.09
MCSV  0CE9-0000-114DBE5D  / 0CE4-0000-114DBE5D

Load SDFE4 FW...
SDFE-4: Firmware download complete!

Card id 1

Press SPACE key to enter console mode configuration!
```

"Card id" is showed what slot number's line card on your connection. The card IDs are from 1 to 15.

Press the SPACE key when the first screen appears, it can enter to login screen. When you see the login screen, you can logon to device.
Username use "**admin**". When the system prompts you for a password, type "**admin**" to enter is O.K.

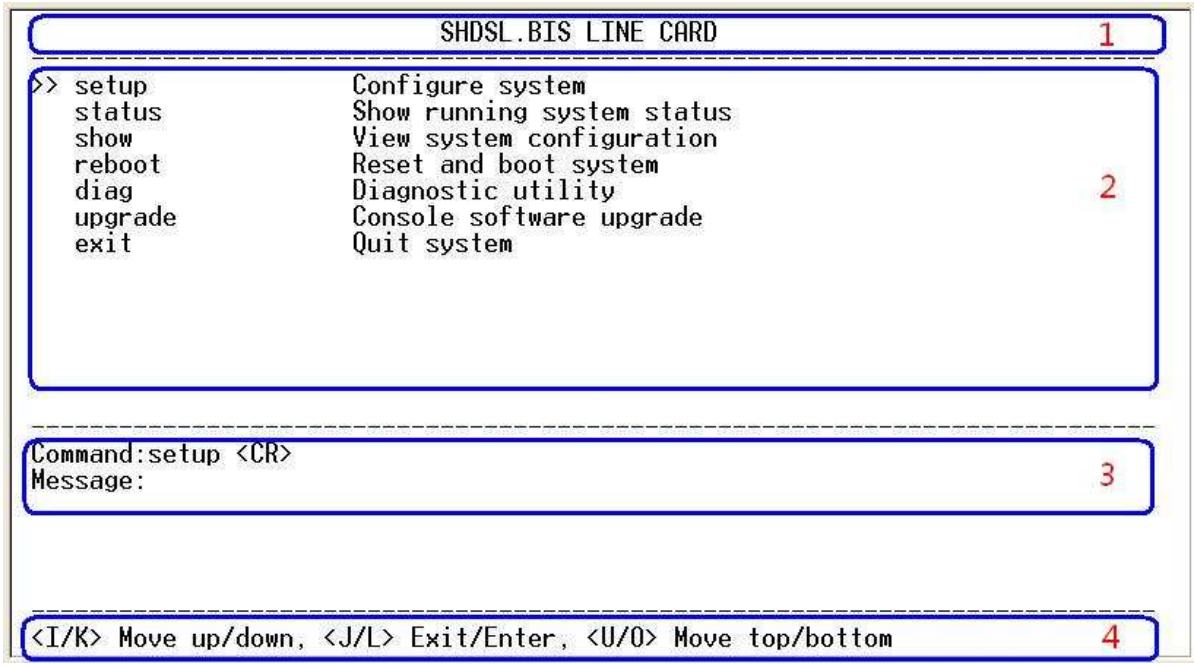
3.2 Operation interface

On serial console, the line cards implement menu driven interface. The menu driven interface is a user-friendly interface to general operations.

The following figure gives you an example of the menu driven interface. In the menu, you scroll up/down by pressing key I / K, select one command by key L, and go back to a higher level of menu by key J.

For example, to show the system information, just logon to the line card, move down the cursor by pressing key K twice and select “show” command by key L, you shall see a submenu and select “system” command in this submenu, then the system will show you the general information.

3.3 Window structure

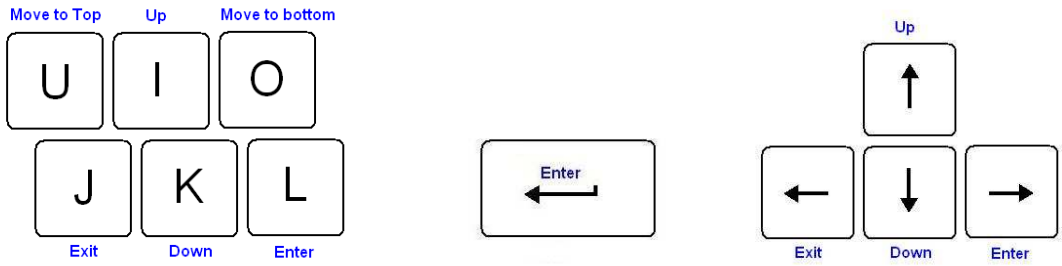


From top to bottom, the window is divided into four parts:

1. **Product name**: “SHDSL.BIS LINE CARD”
2. **Menu field**: Menu tree prompts on this field. Symbol “**>>**” indicates the cursor place.
3. **Configuring field**: You will configure the parameters in this field. **< parameters >** indicates the parameters you can choose and **< more…>** indicates that there have submenu in the title.
4. Operational key-in command list for your reference.

3.4 Menu Driven Interface Commands

Before changing the configuration, familiarize yourself with the operations list in the following table. The operation list will be shown on the bottom field of the window.



Menu Driven Interface Commands

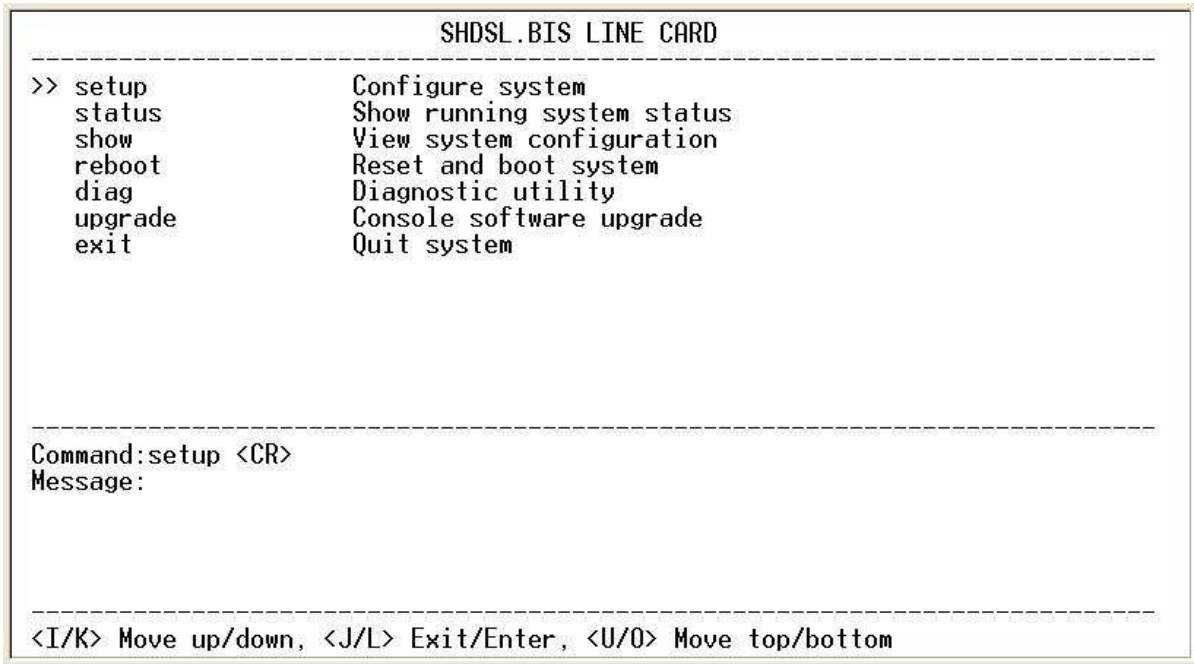
Keystroke	Description
[UP] or I	Move to above field in the same level menu.
[DOWN] or K	Move to below field in the same level menu.
U	Move to top field in the same level menu
O	Move to bottom field in the same level menu
[LEFT] or J	Move back to previous menu
[RIGHT] or L	Move forward to submenu
[ENTER]	Move forward to submenu
[TAB]	To choose another parameters
Ctrl + C	To quit the configuring item

After you have some necessary setting for line card, if may show "Message: Done, Reboot needed". You must make sure to write the new configuration to NVRAM by "reboot" command and then reboot the system. Otherwise, all of your changes will not take effect.

If it doesn't show everything when you have set up some configuration items, it means that it take effect automatic. You needn't take the "reboot" operation.

3.5 Main menu

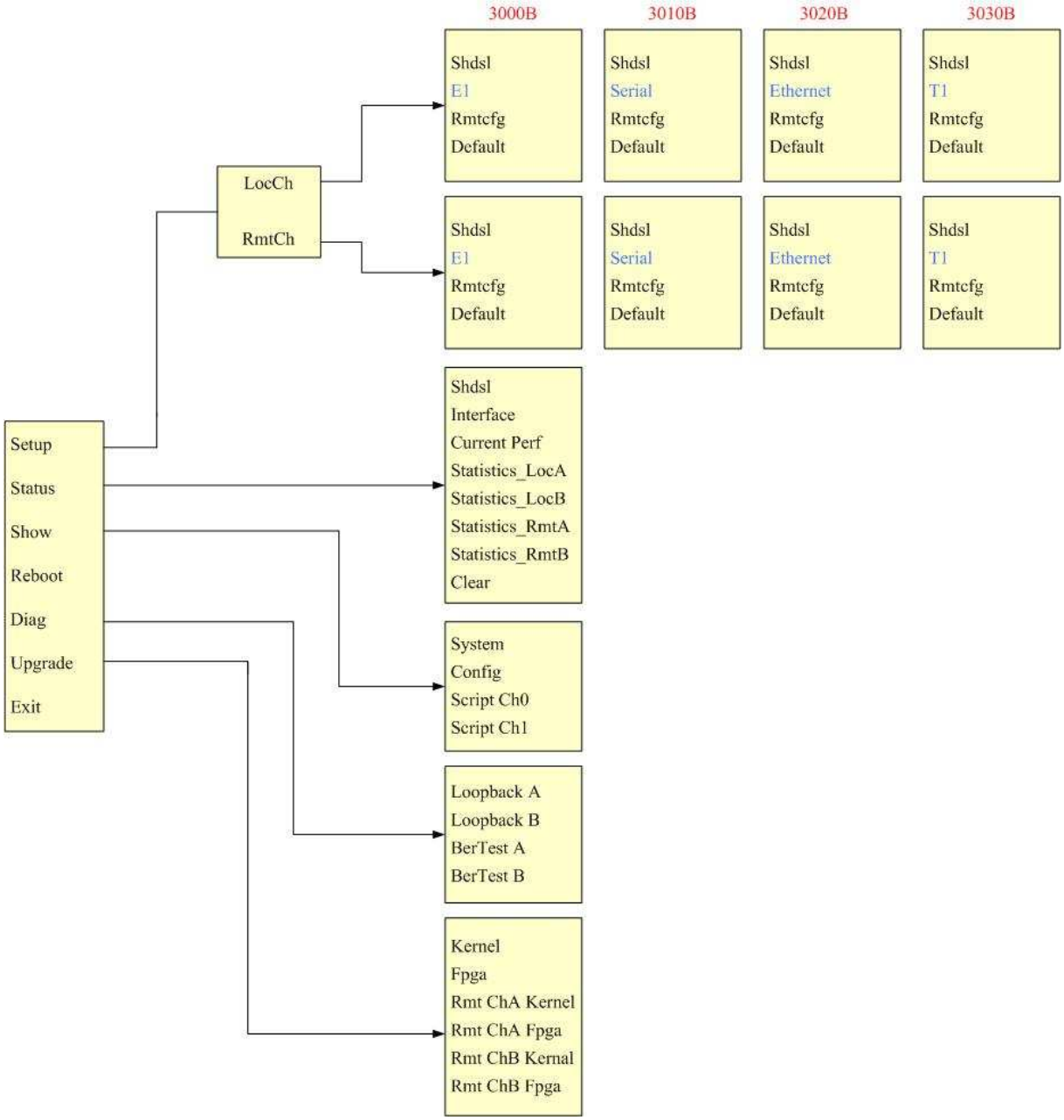
The main menu is as following:



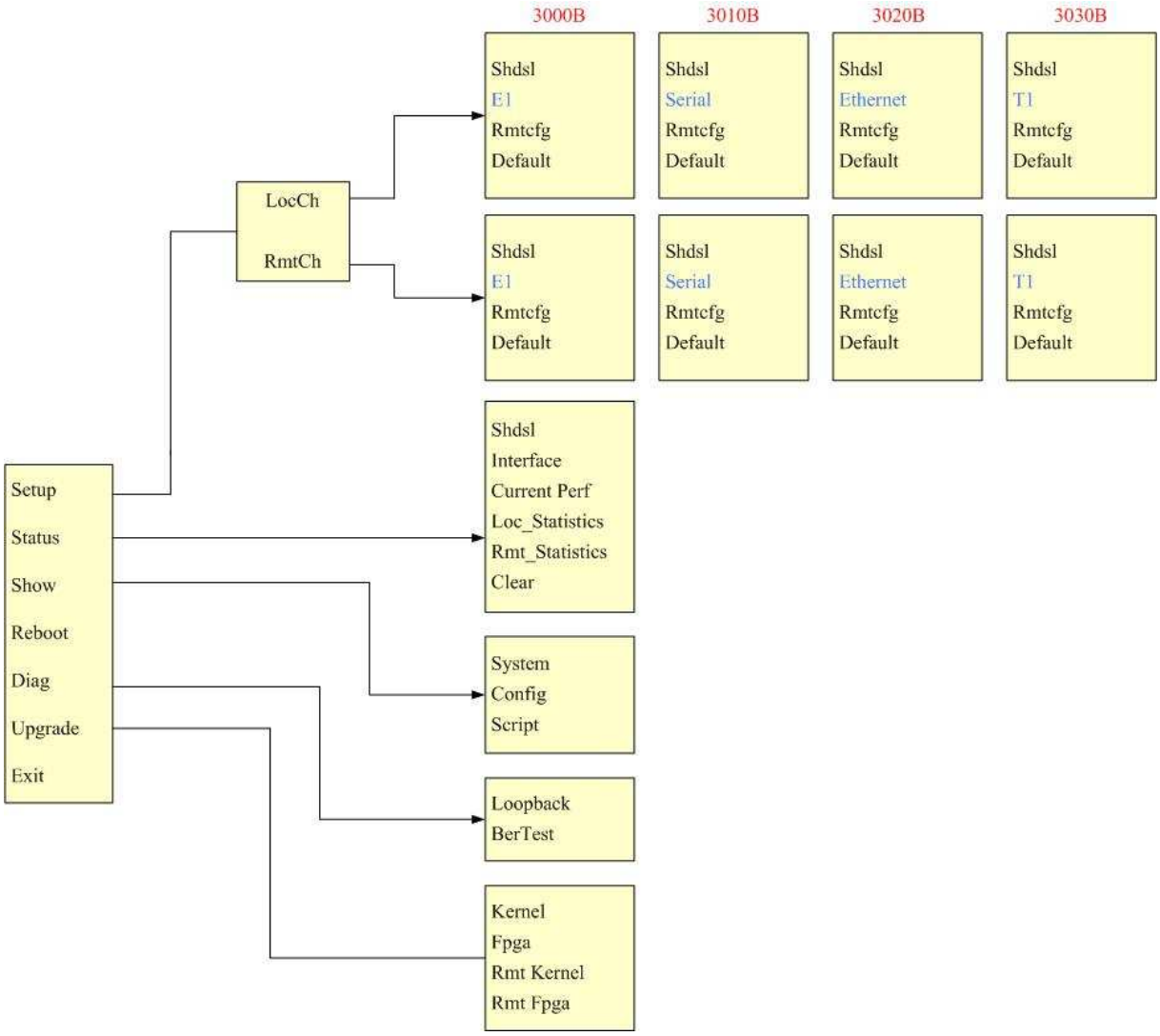
The main menu is prompted as following:

Menu Title	Function
Setup	Use this menu to setup SHDSL type, SHDSL parameters and E1/V.35/Ethernet /T1 parameters or restore factory default setting.
Status	Use this menu to show SHDSL status, E1/V.35/Ethernet/T1 status and statistics or clear the statistics
Show	Use this menu to show general information, all configurations and all configurations in command script.
Reboot	Use this menu to reset and reboot the system
Diag	Use this menu to setup diagnostic utility
Upgrade	Use this menu to upgrade the firmware (kernel and FPGA code)
Exit	Use this menu to exit

3.5.1 Menu Tree diagram - 2 wire mode

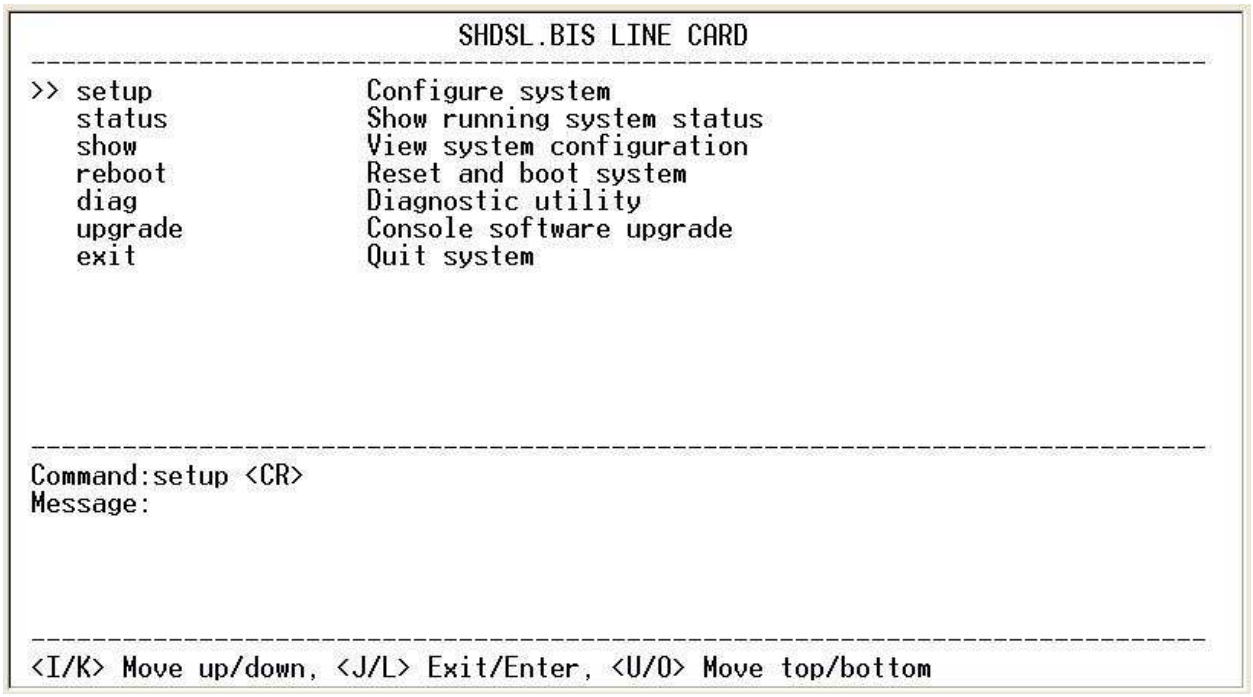


3.5.2 Menu Tree diagram - 4 wire mode



3.6 Setup

From the main configuration menu, we can enter the setup sub menu by placing the cursor on the setup menu item and pressing the right arrow key or the ENTER key.



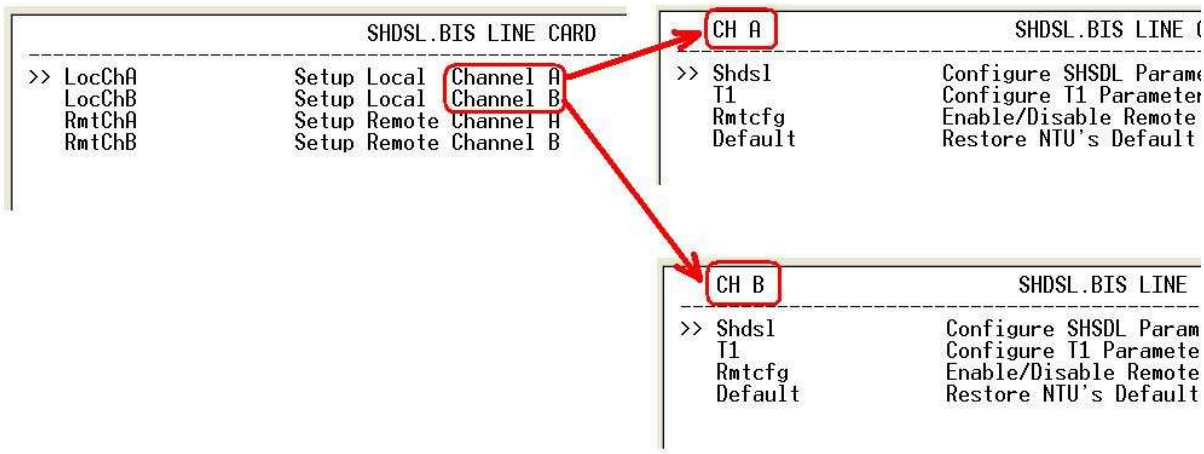
3.6.1 Setup Local

For 1 pair (2-wire) mode:

When using 2-wires (one pair) configuration, the line card has two separate channels, A and B.

```
                              SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
>> LocChA                Setup Local  Channel A
   LocChB                Setup Local  Channel B
   RmtChA                Setup Remote Channel A
   RmtChB                Setup Remote Channel B









--------------------------------------------------------------------------------
Command:LocChA <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When enter the channel A or B, you can view the left-top side shows CH A or CH B.

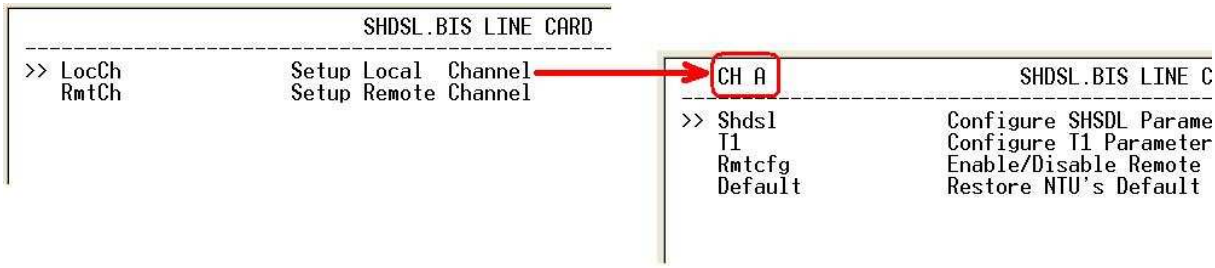


For 2 pair (4-wire) mode:

When using 4-wires (two pair) configuration, the line card has only one channel.

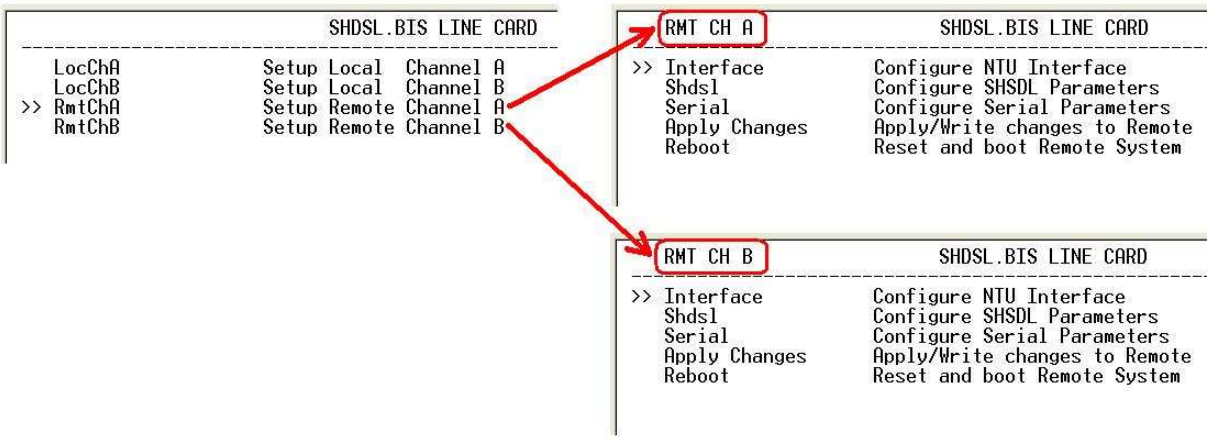
```
                              SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
>> LocCh                Setup Local  Channel
   RmtCh                Setup Remote Channel









--------------------------------------------------------------------------------
Command:LocCh <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Because there are only one channel, you can only view the left-top side shows CH A.



3.6.2 Setup Remote

If the Line card has connected to remote side, it can make a setup remote operation. Following diagram show SHRM03b-V35 Serial interface Line card connect to two 5010B Serial interface NTU. The line card use 2-wire mode.


SHDSL.BIS LINE CARD
LocChA Setup Local Channel A
LocChB Setup Local Channel B
>> RmtChA Setup Remote Channel A
RmtChB Setup Remote Channel B
RMT CH A
SHDSL.BIS LINE CARD
>> Interface Configure NTU Interface
Shdsl Configure SHSDL Parameters
Serial Configure Serial Parameters
Apply Changes Apply/Write changes to Remote
Reboot Reset and boot Remote System
RMT CH B
SHDSL.BIS LINE CARD
>> Interface Configure NTU Interface
Shdsl Configure SHSDL Parameters
Serial Configure Serial Parameters
Apply Changes Apply/Write changes to Remote
Reboot Reset and boot Remote System

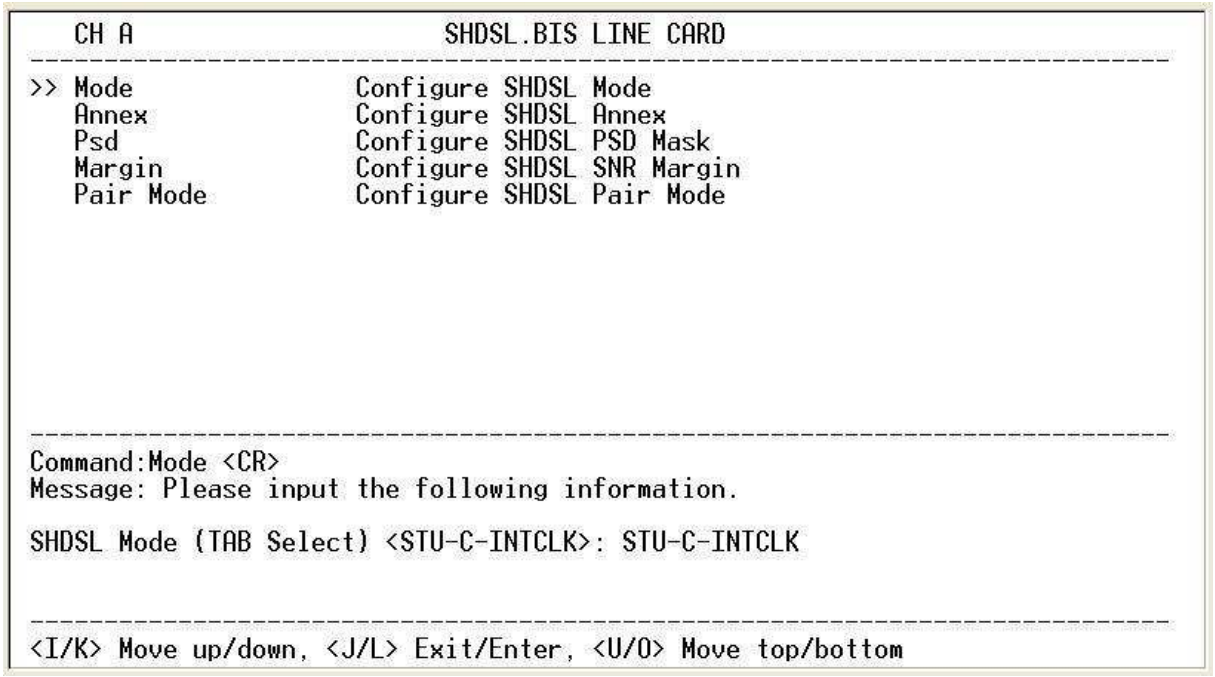
When enter the remote channel A or B, you can view the left-top side shows **RMT CH A** or **RMT CH B**.

3.6.3 Shdsl

The SHDSL setting including Mode, Annex, Psd, Margin and Pair mode.

3.6.3.1 Mode

The mode of SHDSL.bis refers to the clock and the clock setting of the line card. The settings for the line card are for either internal clock (STU-C-INTCLK) or recovery clock (STU-C-EXTCLK).


CH A SHDSL.BIS LINE CARD
>> Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Pair Mode Configure SHDSL Pair Mode
Command:Mode <CR>
Message: Please input the following information.
SHDSL Mode (TAB Select) <STU-C-INTCLK>: STU-C-INTCLK
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

STU-C-INTCLK : Where the clock source is set to internal

STU-C-EXTCLK : Where the clock source is set to external

[E1 interface line card] SHRM03b-E1

When connecting this equipment to G.703 E1 transmission equipment, the normal clock setting should be to take the E1 network timing. In this case the correct setting for this line card should be STU-C-EXTCLK.

[Serial interface line card] SHRM03b-V35

Unless the connected data communications equipment is acting as a DCE and provides clock to the ETC pin, the correct setting for this line card should be STU-C-INTCLK.

[Ethernet interface line card] SHRM03b-ET100

Since Ethernet does not provide a clock, the correct setting for this line card should always be STU-C-INTCLK.

[T1 interface line card] SHRM03b-T1

When connecting this equipment to G.703 T1 transmission equipment, the normal clock setting should be to take the T1 network timing. In this case the correct setting for this line card should be STU-C-EXTCLK.

3.6.3.2 Annex

The 'Annex' setting refers to Annex A (ANSI), Annex B (ETSI), Annex F or Annex G setting of the SHDSL.bis . The preferred and default setting is Annex G. However, when you set the Annex, the CPE side device must match the same Annex as the setting of the CO side line card.

```
   CH A                        SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
>> Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
   Margin               Configure SHDSL SNR Margin
   Pair Mode            Configure SHDSL Pair Mode









--------------------------------------------------------------------------------
Command:Annex <CR>
Message: Please input the following information.

SHDSL Annex (TAB Select) <Annex-G>: Annex-G


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

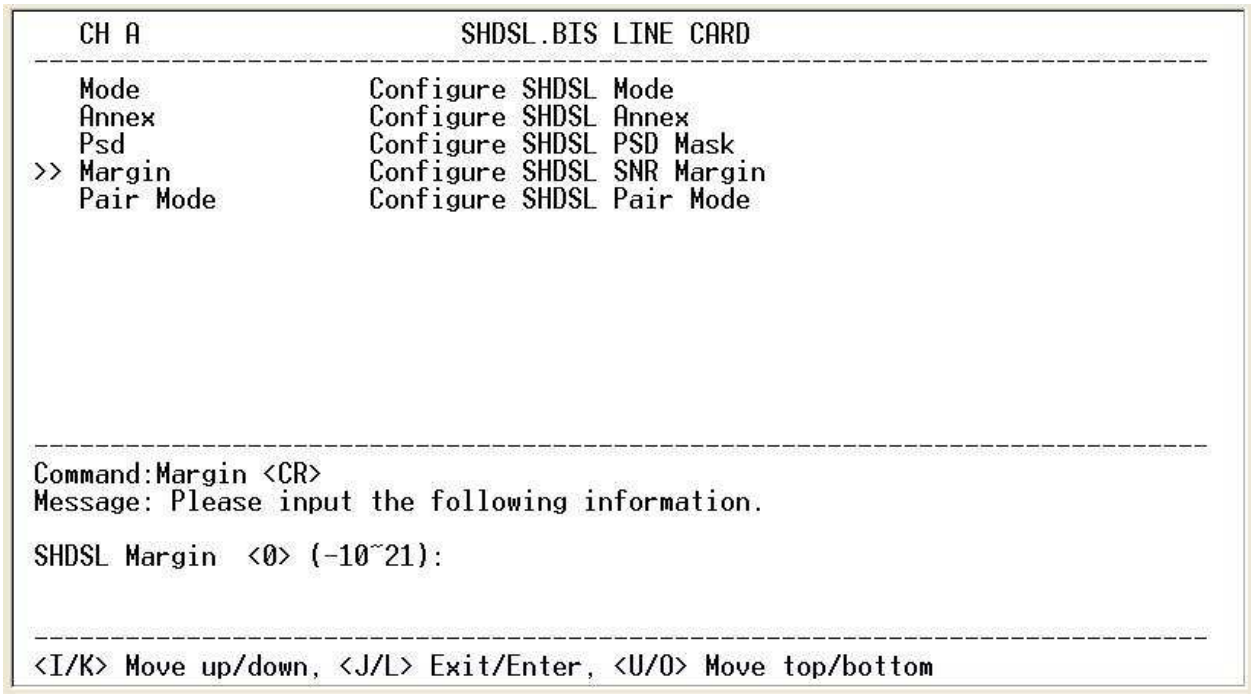
3.6.3.3 Psd

There are two type of PSD mask can select: SYM and for ASYM. The preferred and default setting is SYM.

```
   CH A                        SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
   Annex                Configure SHDSL Annex
>> Psd                  Configure SHDSL PSD Mask
   Margin               Configure SHDSL SNR Margin
   Pair Mode            Configure SHDSL Pair Mode









--------------------------------------------------------------------------------
Command:Psd <CR>
Message: Please input the following information.

SHDSL PSD Mask (TAB Select) <SYM>: SYM


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

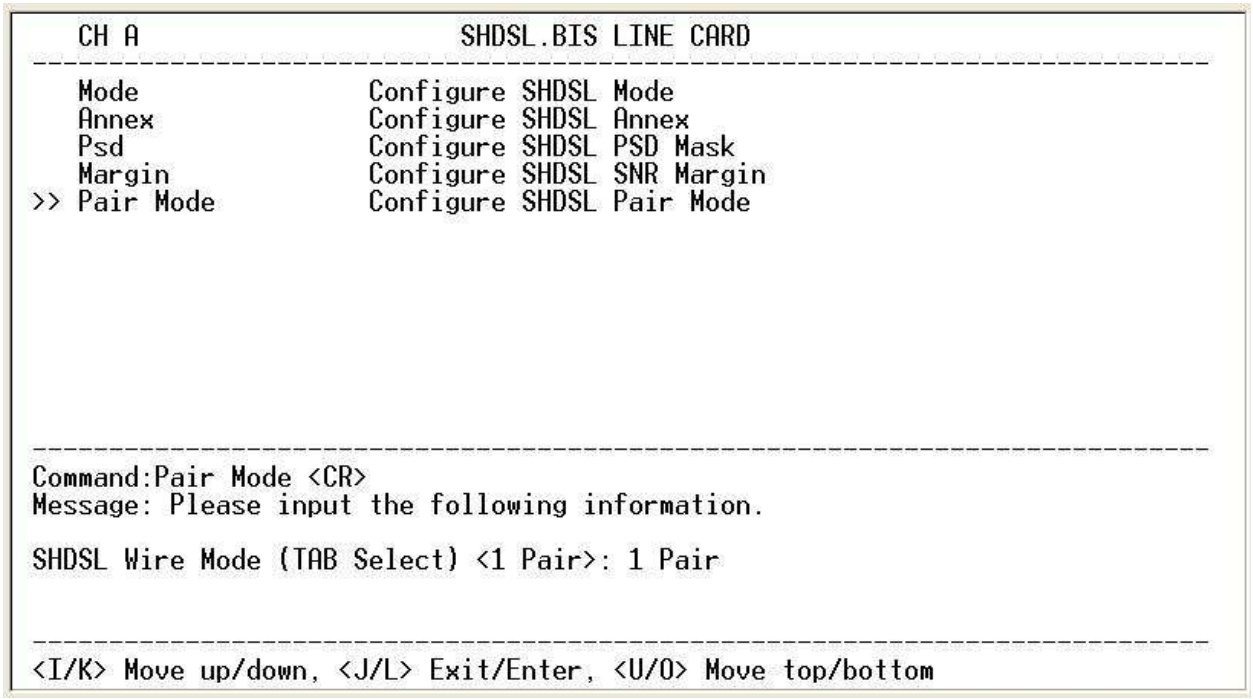
3.6.3.4 Margin

SHDSL SNR (Signal to Noise Ratio) margin: the margin range setting is from -10 to 21. Default is 0. SNR margin is an index of line connection quality. You can see the actual SNR margin in STATUS SHDSL. The larger the SNR margin, the better the line connection. If you set the SNR margin in the setting field as 3, the SHDSL.bis connection will drop and reconnect when the SNR margin is lower than 3. This will allow the device to reduce the line rate (if rate adaptive setting is active) and reconnect for a better line connection.


CH A SHDSL.BIS LINE CARD
Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
>> Margin Configure SHDSL SNR Margin
Pair Mode Configure SHDSL Pair Mode
Command:Margin <CR>
Message: Please input the following information.
SHDSL Margin <0> (-10~21):
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

3.6.3.5 Pair Mode

You can select one pair or two pair mode.


CH A SHDSL.BIS LINE CARD
Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
>> Pair Mode Configure SHDSL Pair Mode
Command:Pair Mode <CR>
Message: Please input the following information.
SHDSL Wire Mode (TAB Select) <1 Pair>: 1 Pair
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

SHDSL parameter setting:

SETUP SHDSL	*Selection items*
MODE	STU-C-INTCLK, STU-C-EXTCLK
ANNEX	A, B, F, G
PSD	SYM, ASYM
MARGIN	-10 to 21
PAIR MODE	1 Pair, 2 Pair

3.6.4 Setup - E1 interface

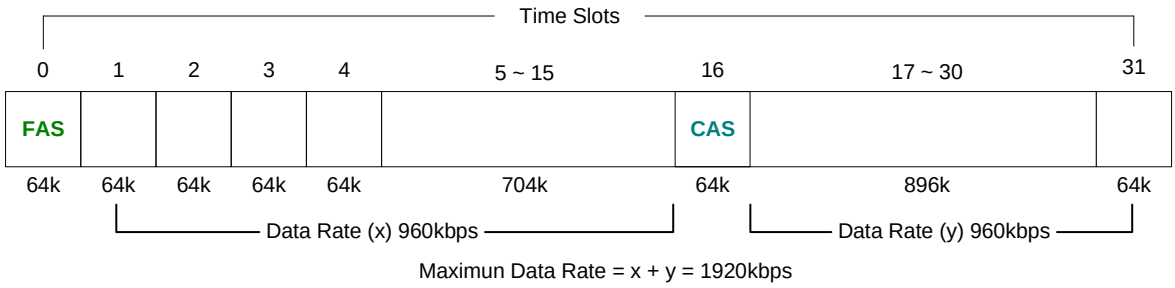
3.6.4.1 Channel

Framing is required to recover the channelized E1. In transparent operation, the framing is configured as Unframed. In this case the G.SHDSL framer must be set to Nx64 with N=32. For any framing such as FAS or CAS, the G.SHDSL framer must be set to E1, then the E1 framing here may be set accordingly.

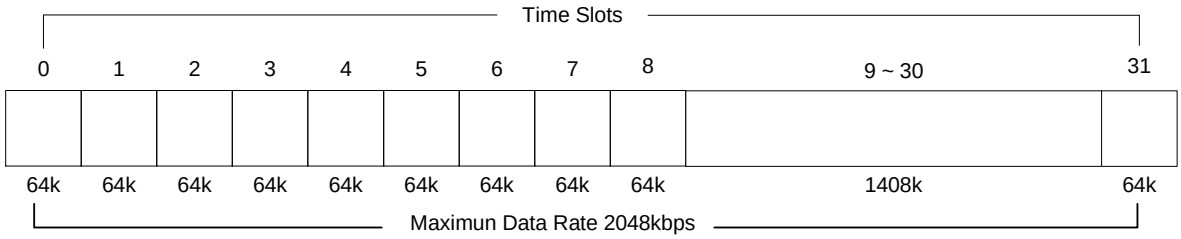
The cross reference table between Channel and Framing:

Channel	Framing
PCM31	FAS
PCM31C	FAS+CRC4
PCM30	FAS+CAS
PCM30C	FAS+CAS+CRC4
FULL	Unframed

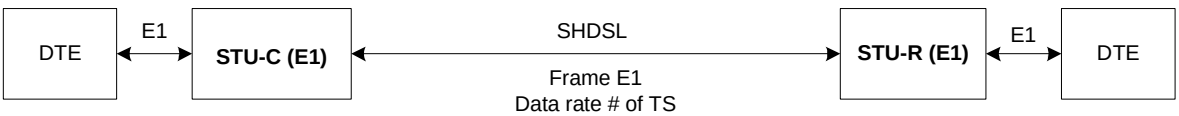
FAS	Frame Alignment Signal uses a 7-bits pattern to establish and maintain the frame synchronization. The FAS word is located in timeslot 0 of frame. In FAS mode there are 1~31 timeslot available for use data.
CAS	Also known as time slot 16 multi-framing. It requires a multi-framing alignment signal to be present for frame sync. The Multi-frame Alignment Signal (MFAS) is inserted into the 16th timeslot of frame 0 of the 16-frame multi-frame. In CAS mode, there are 30 channels available for user data. If timeslot 16 is included in the unit's mapping, it will be disregarded.



CRC4	The CRC-4 checksum bits are transmitted in the outgoing E1 data stream. Also the received signal is checked for errors. CRC-4 checksum cannot be sent in unframed mode.
Unframed	In this mode, user data is inserted into all 32 channels (64k x 32 = 2048k) of the E1 stream. The object of running without framing is to utilize the full bandwidth of the E1 line.

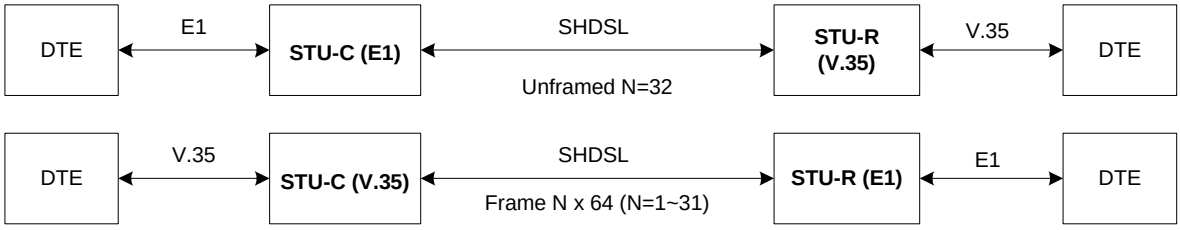


ITU 991.2 (2004) (G.SHDSL .Bis) supports data rate up to 5696Kbps, but G.703 (E1 standard) only supports data rate of 2048kbps so the maximum data rate of SHDSL line, connected with E1 DCEs, depends on data rate of E1, 2048kbps.



If the connection is E1 vs V.35 or V.35 vs E1, the frame has to be used N x 64k. In this case, the data rate depends on value of N. Same as above case, SHDSL and V35 can support up to 5696kbps data rate, but E1 supports maximum

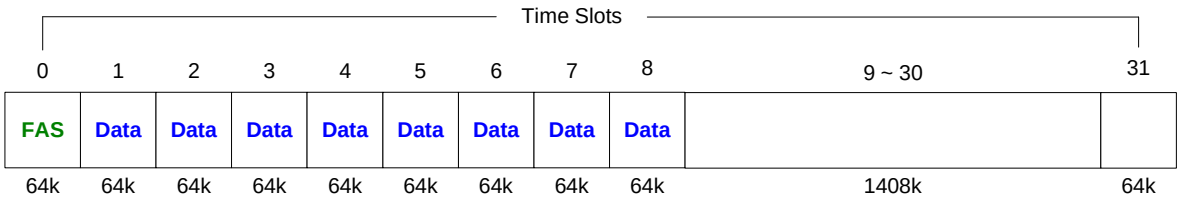
data rate of 2048kbps (32 x 64k).



Time slots, N value, are placed in the frame. If time Slot Number is1 from 1~31 (N=1~31), it is Fractional E1. If time Slot Number is 32 (N=32), it is unframed.

Fractional E1

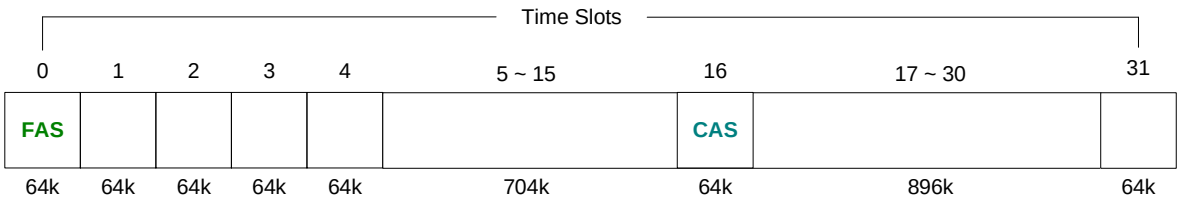
For fractional E1(FE1), the data rate is from 64k(N=1) to 1984k(N=31), according to the E1 framing. If the E1 frame is PCM31(FAS) or PCM31C(FAS+CRC4), there are 1~31 available time slot for use data. For example, if the data rate of SHDSL line set to be 512k, the time slot number is 8 and first time slot number is 1. The frame is shown as below.



The First Time Slot setting of PCM31(FAS) and PCM31C(FAS+ CRC4) have to follow the rule:

First Time Slot ≦ 31 - Time Slot Number

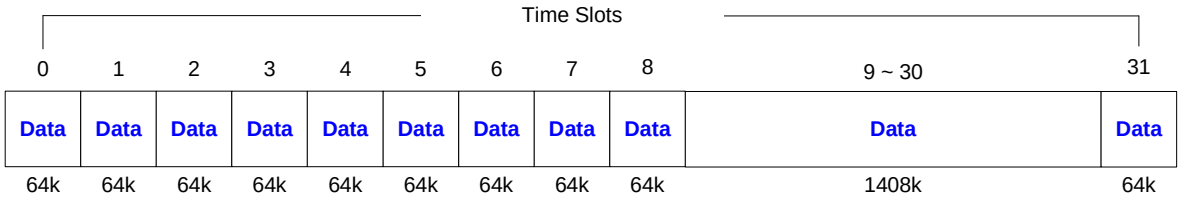
Using the E1 framing of PCM30(FAS+CAS) or PCM30C(FAS+CAS+CRC4), the FAS will occupy Time Slot 0 and CAS Time Slot 16. There are only 30 Time Slot left for data. On the other hand, the data rate is 1920kbps.



The First Time Slot setting of PCM30(FAS+CAS) and PCM30C(FAS+CAS+CRC4) have to follow the rule:

First Time Slot ≦ 30 - Time Slot Number

Unframed E1



In Unframed E1, user data are inserted into all 32 channels (64k x 32 = 2048k) of the E1 stream. The object of running without framing is to utilize the full bandwidth of the E1 line.

3.6.4.2 Code

The E1 line card supports two different line codings. HDB3 is the most popular and preferred line coding and is also the default setting. AMI line coding is also selectable.

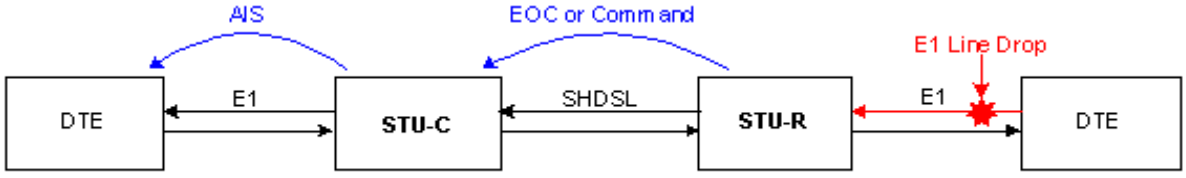
HDB3	In this line coding, the transmitter substitutes a deliberate bipolar violation when excessive zeros in the data stream are detected. The receiver recognizes these special violations and decodes them as zeros. This method enables the network to minimize pulse density requirements. Unless AMI is required for your application, HDB3 should be used whenever possible.
AMI	Alternate Mark Inversion defines a pulse as a "mark," a binary one, as opposed to a zero. In an E1 network connection, signals are transmitted as a sequence of one and zero. One is sent as pulse, and zero is sent as spaces, i.e. no pulse. Every other pulse is inverted from the previous pulse in polarity, so

	that the signal can be effectively transmitted. This means, however, that a long sequence of zeros in data stream will cause problems, since the NTU receiving the signal relies on the signal to recover the 2048kbps clock.

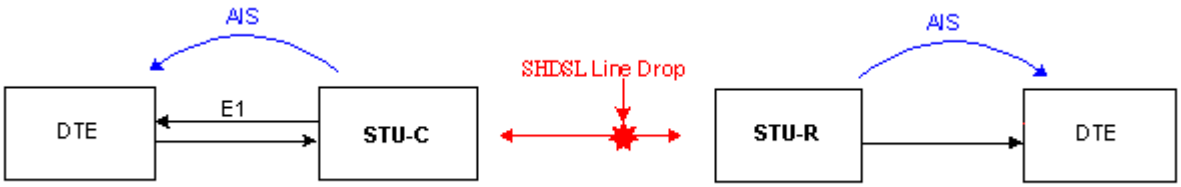
3.6.4.3 Ais

AIS or Alarm Indication Signal is a method to inform the remote connection that there is a signal or sync problem with the E1. AIS is only valid in framed mode E1, not in Unframed E1. The setting here of AIS enabled (on) or not (off) and is for testing with AIS. When enabled, the E1 will transmit the AIS and it should be confirmed at the remote device (AIS indication lit). After testing, please turn AIS back off.

- Example 1: When STU-R E1 RX line is dropped, STU-R sends the status to STU-C via EOC or command, and then STU-C will send AIS (Alarm Indication Signal) to DTE while AIS function is enabled.

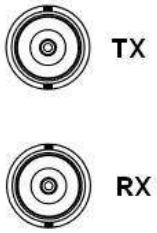


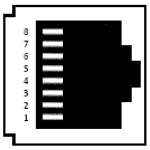
- Example 2: When SHDSL connection drops, STU-R and STU-C both send AIS (Alarm Indication Signal) to DTE in the same time while AIS function is enabled.



3.6.4.4 Build outs

The E1 line card supports both unbalanced E1 at 75 ohms and balanced E1 at 120 ohms. The settings for impedance are made here under the build out menu setting.





75 Ohms
BNC Connector

120 Ohms
RJ-45 Connector

E1 parameter setting:

E1 Items	Setting
Channel	PCM31 PCM31C PCM30 PCM30C FULL
Code	HDB3 AMI
AIS	On Off
Build Outs	120 ohms 75 ohms

Framer Setting:

Framer		Slot Number	First Slot
PCM31	FAS	1 to 31	1 to 31
PCM31C	FAS+CRC4	1 to 31	1 to 31
PCM30	FAS+CAS	1 to 30	1 to 31 (cannot use 16)
PCM30C	FAS+CAS+CRC4	1 to 30	1 to 31 (cannot use 16)
FULL	UNFRAMED		

3.6.5 Setup – Serial interface

The serial settings include the interface mode, data rate, clocking and handshaking lines setup.

3.6.5.1 Interface

The serial line card supports both V.35 interface and RS-530(X.21) interface.

```
   CH A                        SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Interface <CR>
Message: Please input the following information.

Change Serial Interface (TAB Select) <V35>: V35


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.6.5.2 Data rate

For 2-wires with Annex A and B, the rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).
For 2-wires with Annex F and G, the rate can be adjusted in increments of 64kbps from 64kbps to 5696kbps (N=1~89).
For 4-wires with Annex A and B, the rate can be adjusted in increments of 64kbps from 128kbps to 4608kbps (N=2~72 , even number only).
For 4-wires with Annex F and G, the rate can be adjusted in increments of 64kbps from 128kbps to 8192kbps (N=2~128, even number only).

```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
>> Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Data rate <CR>
Message: Please input the following information.

Change Serial Nx64 (TAB Select) <12>: 12


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

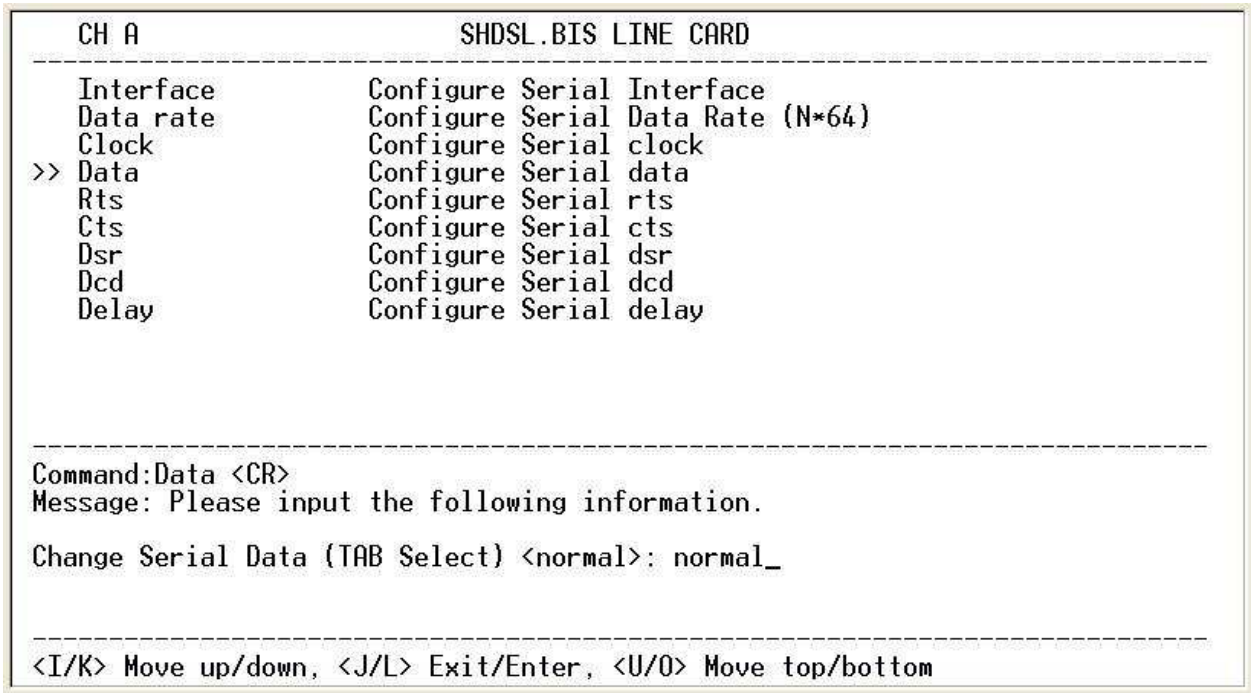
3.6.5.3 Clock

The data port clock polarity may be adjusted to solve some clocking issues. The default setting is 'Normal' clock polarity, where data is sent on the positive transition of the clock, while the option exists to set inverse clock polarity where data is sent on the negative clock transition.

```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
>> Clock              Configure Serial clock
   Data               Configure Serial data
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Clock <CR>
Message: Please input the following information.

Change Serial Clock (TAB Select) <normal>: normal


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.6.5.4 Data

The data polarity may be adjusted to solve some data transfer issues. The default setting is 'Normal' data polarity, where data is sent on the negative transition, while the option exists to set inverse data polarity where data is sent on the positive transition.


CH A SHDSL.BIS LINE CARD
Interface Configure Serial Interface
Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
>> Data Configure Serial data
Rts Configure Serial rts
Cts Configure Serial cts
Dsr Configure Serial dsr
Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Data <CR>
Message: Please input the following information.
Change Serial Data (TAB Select) <normal>: normal_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

3.6.5.5 Rts

The behavior of the RTS (Request To Send) signal may be set in one of two ways. When set 'on', the RTS signal is always forced high (on, positive voltage or SPACE), when set 'from dte' the RTS signal will follow the DTE's condition. The default setting for RTS is from DTE.

```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
>> Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Rts <CR>
Message: Please input the following information.

Change Serial RTS (TAB Select) <on>: on_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.6.5.6 Cts

The behavior of the CTS (Clear To Send) signal may be set in one of three ways. When set 'on', the CTS signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or CTS will follow RTS (Request To Send) condition of 'on' for RTS on or 'off' for RTS off. The default setting for CTS is to follow RTS.

```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   Rts                Configure Serial rts
>> Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Cts <CR>
Message: Please input the following information.

Change Serial CTS (TAB Select) <from_rts>: from_rts


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

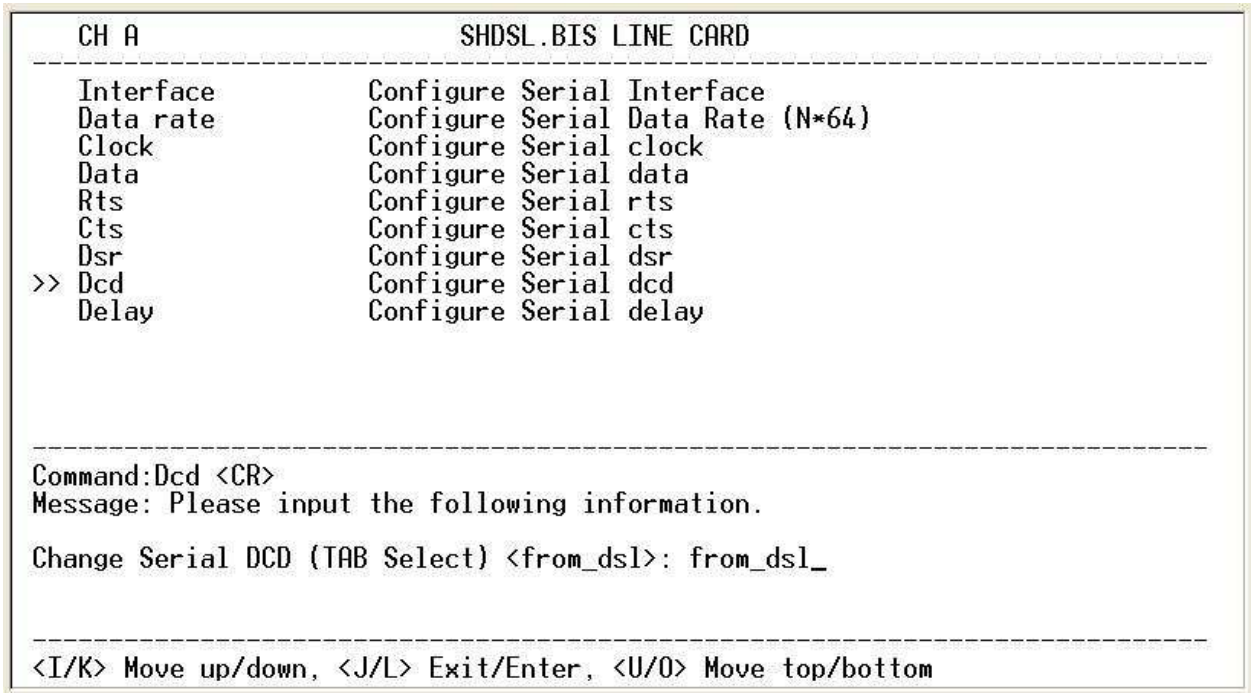
3.6.5.7 Dsr

The behavior of the DSR (Data Set Ready) signal may be set in one of three ways. When set 'on', the DSR signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DSR will follow DTR (Data Terminal Ready) condition of 'on' for DTR on or 'off' for DTR off. The default setting for DSR is to follow DTR.

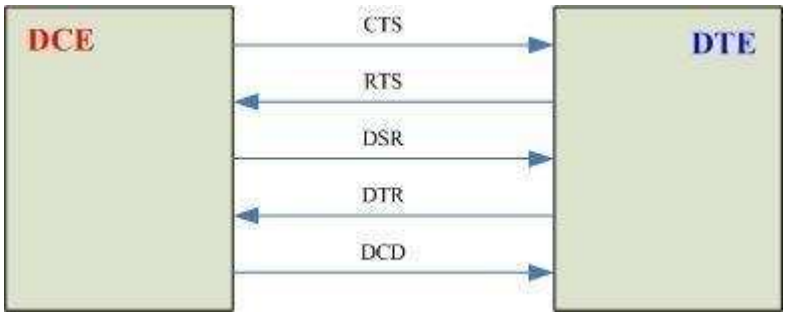
```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   Rts                Configure Serial rts
   Cts                Configure Serial cts
>> Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Dsr <CR>
Message: Please input the following information.

Change Serial DSR (TAB Select) <on>: on_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.6.5.8 Dcd

The behavior of the DCD (Data Carrier Detect) signal may be set in one of three ways. When set 'on', the DCD signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DCD will follow the DSL condition of 'on' for DSL link or 'off' for no link. The default setting for DCD is to follow the DSL link status.


CH A SHDSL.BIS LINE CARD
Interface Configure Serial Interface
Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
Data Configure Serial data
Rts Configure Serial rts
Cts Configure Serial cts
Dsr Configure Serial dsr
>> Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Dcd <CR>
Message: Please input the following information.
Change Serial DCD (TAB Select) <from_dsl>: from_dsl_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

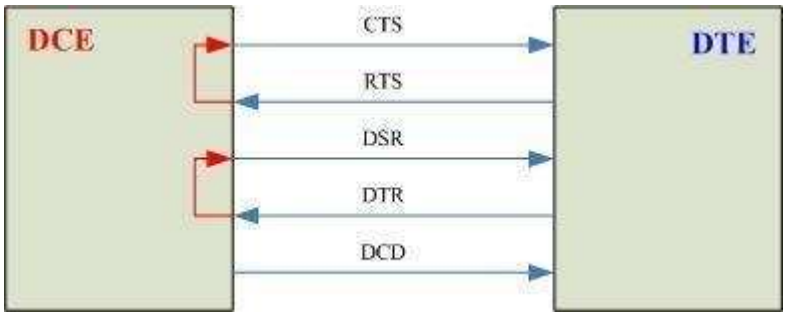
The handshake signal direction between DCE and DTE



V.35 Interface Line Card

SHRM03b-V35

The below diagram shows CTS follow RTS, DSR follow DTR



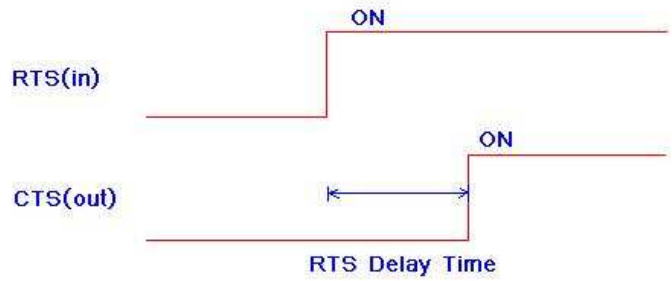
V.35 Interface Line Card

SHRM03b-V35

3.6.5.9 Delay

The delay setting is used to cause a delay for CTS to follow RTS. The delay setting may be set from 0 to 3 milliseconds. The default setting is 3 milliseconds.

```
   CH A                        SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
>> Delay              Configure Serial delay



--------------------------------------------------------------------------------
Command:Delay <CR>
Message: Please input the following information.

Change Serial Delay <3> (0~3): _


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```



The RTS delay time is use to control CTS on delay to RTS signal, It works only for the setting:
CTS follow RTS and *RTS follow from DTE* .

V.35 Interface control signals settings table:

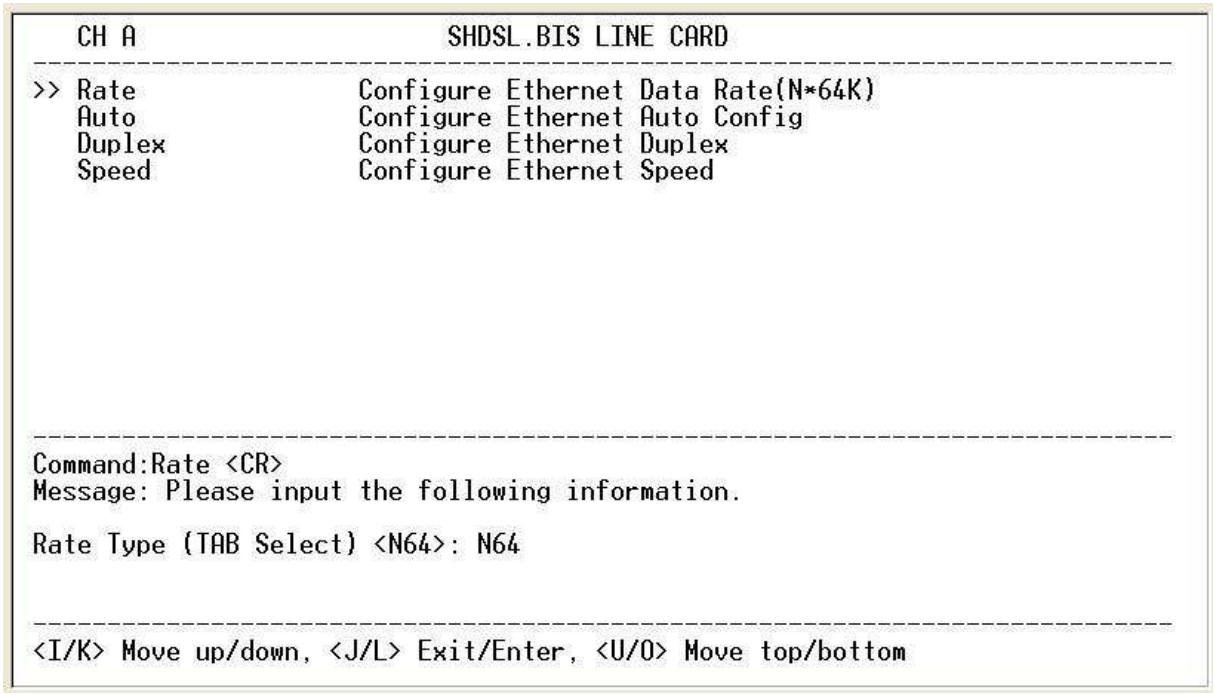
Serial Items	Setting		
INTERFACE	V.35 X.21(RS-530)		
DATA RATE (Nx64K mode)	2-wires	Annex A/B	1 ~ 36
		Annex F/G	1 ~ 89
	4-wires	Annex A/B	2 ~ 72 (even number only)
		Annex F/G	2 ~ 128 (even number only)

CLOCK	Normal Inverse
DATA	Normal Inverse
RTS	On From DTE
CTS	On Off From RTS
DSR	On Off From DTR
DCD	On Off From DSL
DELAY	0mS 1mS 2mS 3mS

3.6.6 Setup – Ethernet interface

The Ethernet settings include the data rate, negotiation, duplex the speed.

Date Rate


CH A SHDSL.BIS LINE CARD
>> Rate Configure Ethernet Data Rate(N*64K)
Auto Configure Ethernet Auto Config
Duplex Configure Ethernet Duplex
Speed Configure Ethernet Speed
Command:Rate <CR>
Message: Please input the following information.
Rate Type (TAB Select) <N64>: N64
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

For 2-wires with Annex A and B, the rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).
For 2-wires with Annex F and G, the rate can be adjusted in increments of 64kbps from 64kbps to 5696kbps (N=1~89).
For 4-wires with Annex A and B, the rate can be adjusted in increments of 64kbps from 128kbps to 4608kbps (N=2~72, even number only).
For 4-wires with Annex F and G, the rate can be adjusted in increments of 64kbps from 128kbps to 11392kbps (N=2~178, even number only).

3.6.6.1 Negotiation

You can select Enable and Disable on auto negotiation function. I

```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Rate                Configure Ethernet Data Rate(N*64K)
>> Auto                Configure Ethernet Auto Config
   Duplex              Configure Ethernet Duplex
   Speed               Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Auto <CR>
Message: Please input the following information.

Change Ethernet Auto Config  (TAB Select) <Enable>: Enable_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.6.6.2 Duplex

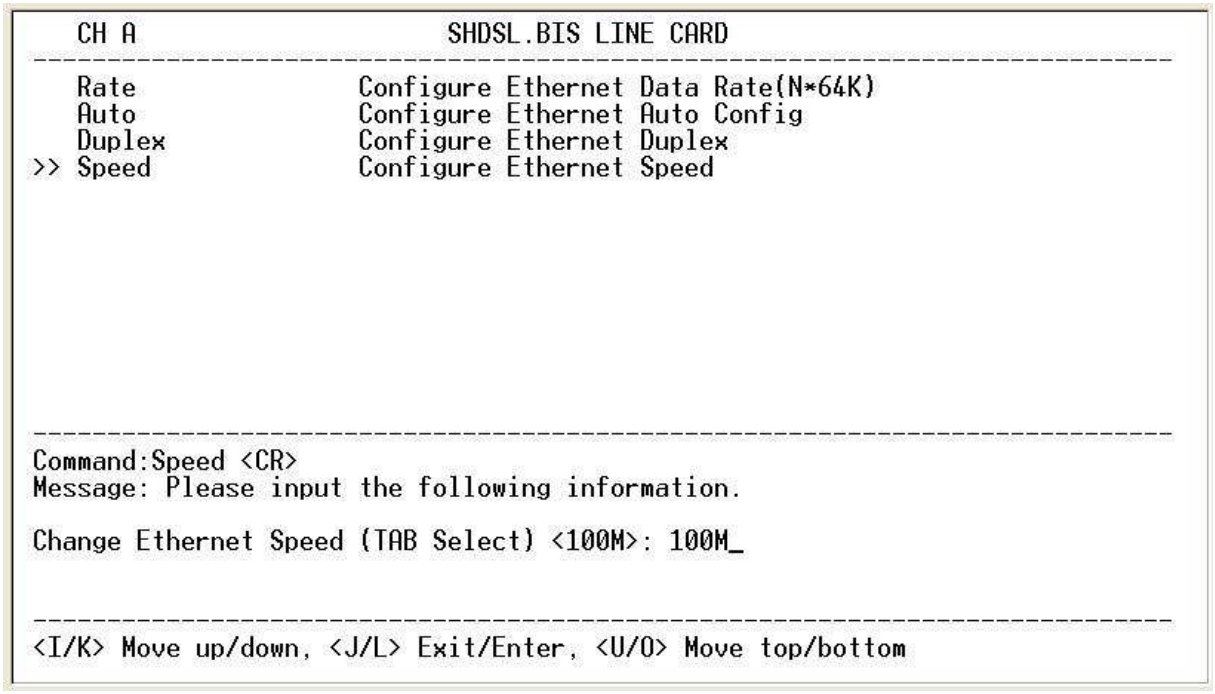
When auto negotiation setup is D**isable**, there has to be a selection of duplex mode: **Full-Duplex** and **Half-Duplex**.

```
   CH A                      SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Rate                Configure Ethernet Data Rate(N*64K)
   Auto                Configure Ethernet Auto Config
>> Duplex              Configure Ethernet Duplex
   Speed               Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Duplex <CR>
Message: Please input the following information.

Change Ethernet Duplex  (TAB Select) <Full-Duplex>: Full-Duplex


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.6.6.3 Speed

When auto negotiation is **Disable**, there has to be selection on speed setting:

10M and **100M**.If auto negotiation is **Enable**, the items **Duplex** and **Speed** cannot be set. The message will display "Ethernet is in auto negotiate"


CH A SHDSL.BIS LINE CARD
Rate Configure Ethernet Data Rate(N*64K)
Auto Configure Ethernet Auto Config
Duplex Configure Ethernet Duplex
>> Speed Configure Ethernet Speed
Command:Speed <CR>
Message: Please input the following information.
Change Ethernet Speed (TAB Select) <100M>: 100M_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

If you set Ethernet Auto Negotiation as **Enable**, the default setting on **Duplex** is **Full** and **Speed** is **100M**.
If you set Ethernet **Auto** Negotiation as Enable, the **Duplex** and **Speed** cannot be set up and it will use auto configuration.

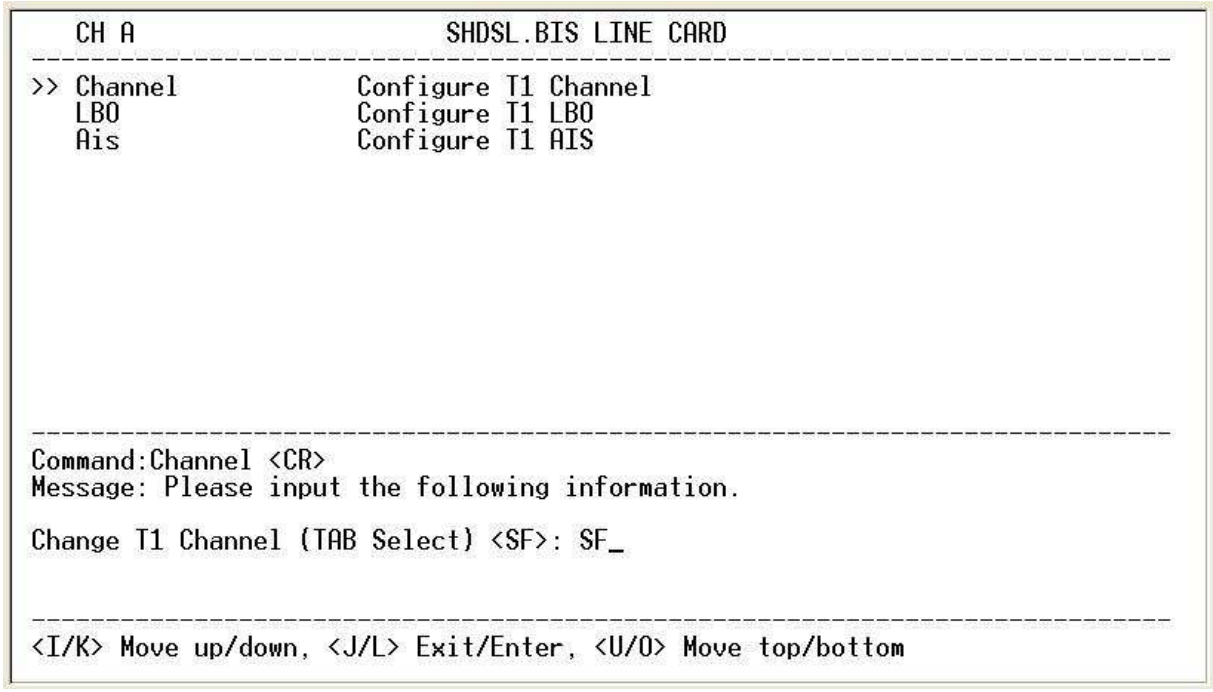
Ethernet parameter setting:

Ethernet Items			Setting	
Rate	2-wires	Annex A/B	1 ~ 36	
		Annex F/G	1 ~ 89	
	4-wires	Annex A/B	2 ~ 72 (even number only)	
		Annex F/G	2 ~ 178 (even number only)	
Auto			Disable	Enable
Duplex			Full-Duplex Half-Duplex	Auto Configuration
Speed			100M 10M	Auto Configuration

3.6.7 Setup – T1 interface

The T1 settings include the Channel, Number of time slots , First time slots, LBO and AIS.

3.6.7.1 Channel


CH A SHDSL.BIS LINE CARD
>> Channel Configure T1 Channel
LBO Configure T1 LBO
Ais Configure T1 AIS
Command:Channel <CR>
Message: Please input the following information.
Change T1 Channel (TAB Select) <SF>: SF_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The T1 interface can be programmed to encode/decode its transmit/receive signals using Bipolar with Eight Zero Suppression (**B8ZS**) coding.

Each T1 frame contains 1 byte of voice data for each of the 24 channels, that system needs then 8000 frames per second to maintain those 24 simultaneous voice channels. Because each frame of a T1 is 193 bits in length (24 channels X 8 bits per channel + 1 framing bit = 193 bits), 8000 frames per second is multiplied by 193 bits to yield a transfer rate of 1.544 Mbit/s (8000 X 193 = 1544000).

The T1 format provides a 64 Kbps channel for each of 24 individual channels. Each of these channels is called a DS-0 channel or a time slot and consists of an eight-bit sample. A T1 frame is constructed by time division multiplexing these 24 time slots and inserting a framing bit at the beginning of the series. This

results in 192 bits of channel data, plus a framing bit (F-bit), for a total of 193 bits in a frame. Multiple frames are then grouped into superframes of 12 or 24 frames to provide for framing synchronization and signaling.

The Superframe(**SF**) (also called D4 or **193S**) format defines a superframe as 12 frames.
The Extended Superframe (**ESF**) (also called **193E**) format groups 24 frames into its superframe.
Both the SF and ESF framing formats provide an actual payload data rate of 1.536 Mbps (192/193 = 1.536/1.544).

For fractional T1 , the data rate is from 64k(N=1) to 1536k(N=24), according to the T1 framing.
When SHDSL.bis using 2-pairs(4-wires), the time slot number can only use even number
The table of number of time slot vs. 1st time slot:

Channel	Number of	1st slot
SF ESF	24	1
	23	1~2
	22	1~3
	21	1~4
	20	1~5
	19	1~6
	18	1~7
	17	1~8
	16	1~9
	15	1~10
	14	1~11
	13	1~12
	12	1~13
	11	1~14
	10	1~15
	9	1~16
	8	1~17

	7	1~18
	6	1~19
	5	1~20
	4	1~21
	3	1~22
	2	1~23
	1	1~24

3.6.7.2 LBO

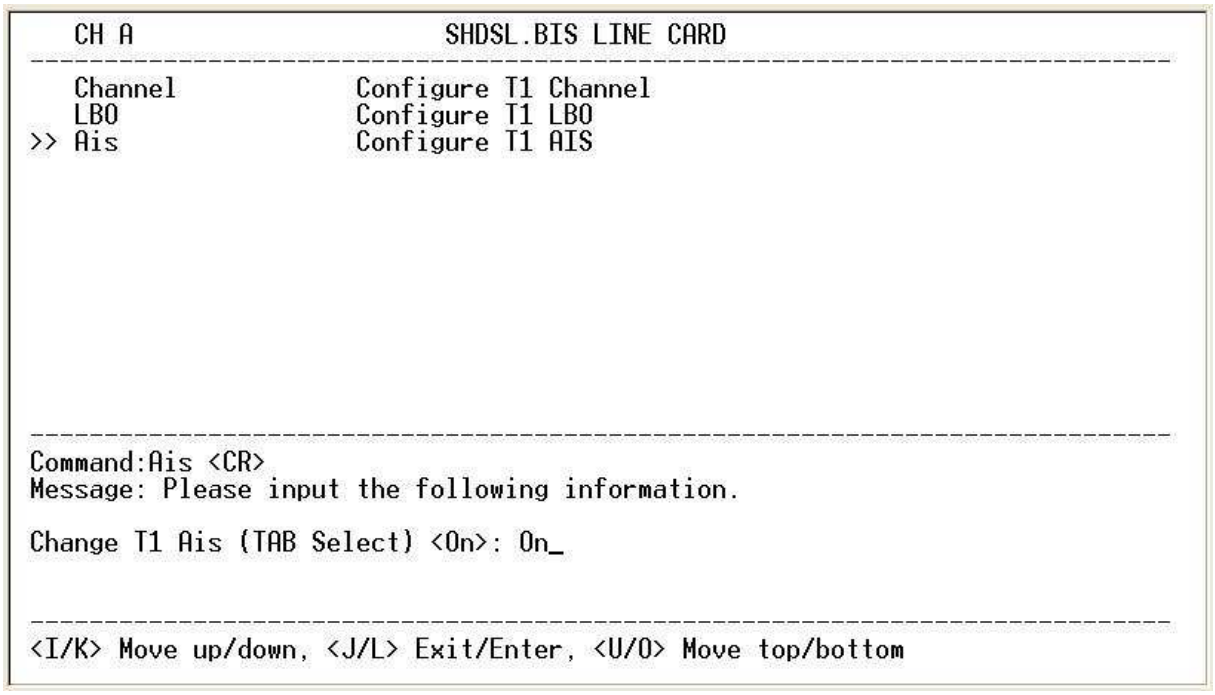
```
   CH A                        SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Channel              Configure T1 Channel
>> LBO                  Configure T1 LBO
   Ais                  Configure T1 AIS









--------------------------------------------------------------------------------
Command:LBO <CR>
Message: Please input the following information.

Change T1 LBO (TAB Select) <0 to 133ft>: 0 to 133ft


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

LBO(Line build-out) setting are an inherent part of T1 network element transmission circuitry. Because cable lengths between T1 device and NTU are vary, LBO settings are designed to adjust the output power of the transmission signal to achieve equal level point (ELP) at the NTU.

For short distance of T1 cable, this device must decreases outgoing signal strength.

There are five type T1 LBO for your select : 0 ~133ft , 133 ~ 266ft , 266 ~399 ft , 399 ft ~ 533ft , 533ft ~ 655ft

3.6.7.3 AIS


CH A SHDSL.BIS LINE CARD
Channel Configure T1 Channel
LBO Configure T1 LBO
>> Ais Configure T1 AIS
Command:Ais <CR>
Message: Please input the following information.
Change T1 Ais (TAB Select) <On>: On_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

AIS (Alarm Indication Signal) is a method to inform the remote connection that there is a signal or sync problem with the T1.

T1 parameter setting:

T1 items	Setting
Channel	SF ESF Unframed
Slot Number	
First Slot	
LBO	0~133ft 133~266ft 266~399ft 399ft~533ft 533~655ft
AIS	Off On

3.6.8 Remote Config

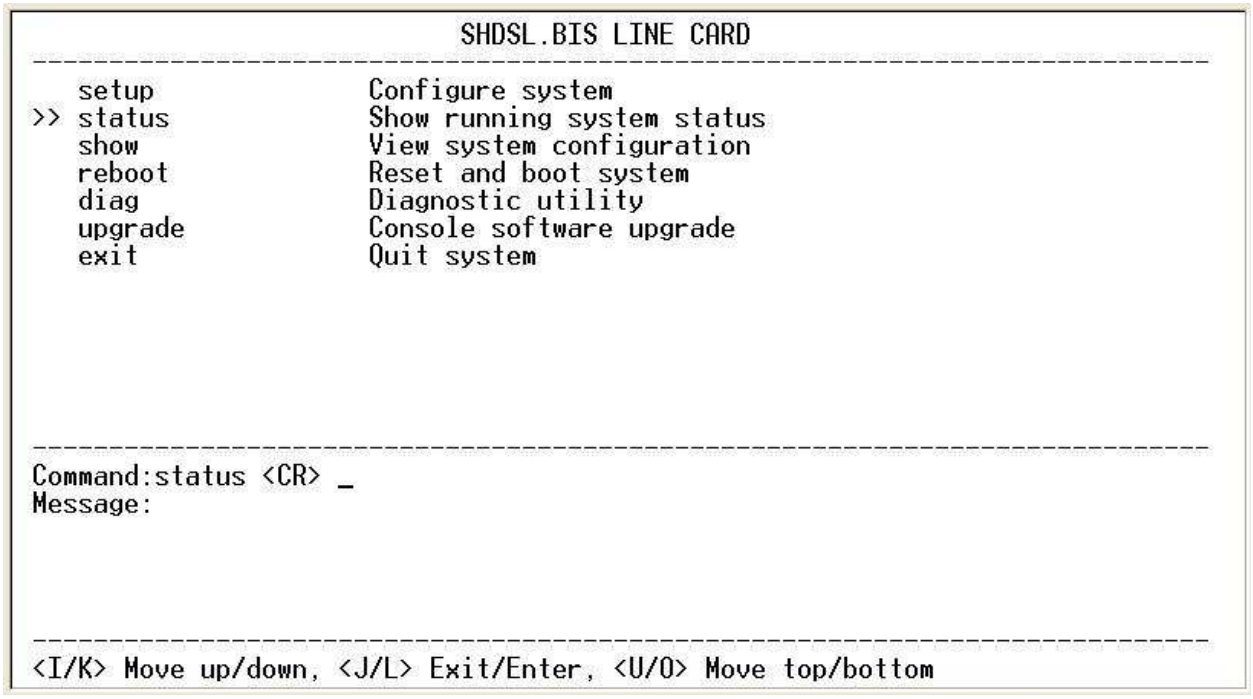
You can set the "Enable/Disable function" to let the remote side configure parameters to this device remotely.

3.6.9 Default

The line card can have all settings restored to their original factory settings simply by going to the setting menu, selecting the 'default' item, and then press ENTER. The system will ask for a y(es) or n(o) confirmation followed by an ENTER.

3.7 Status

From the main setup menu after logging in, arrow key down to select the 'status' menu item and then press the right arrow key or ENTER.



From the main Status Display menu press the right arrow or ENTER when the cursor is on the shdsl menu item.

```
                              SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
>> Shdsl                Show SHDSL Status
   Interface            Show Interface Status
   Current Perf         Show Current Performamce
   Loc_statistics       Show Local Statistics
   Rmt_statistics       Show Remote Statistics
   clear                Clear Channel Statistics









--------------------------------------------------------------------------------
Command:Shdsl <CR>
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

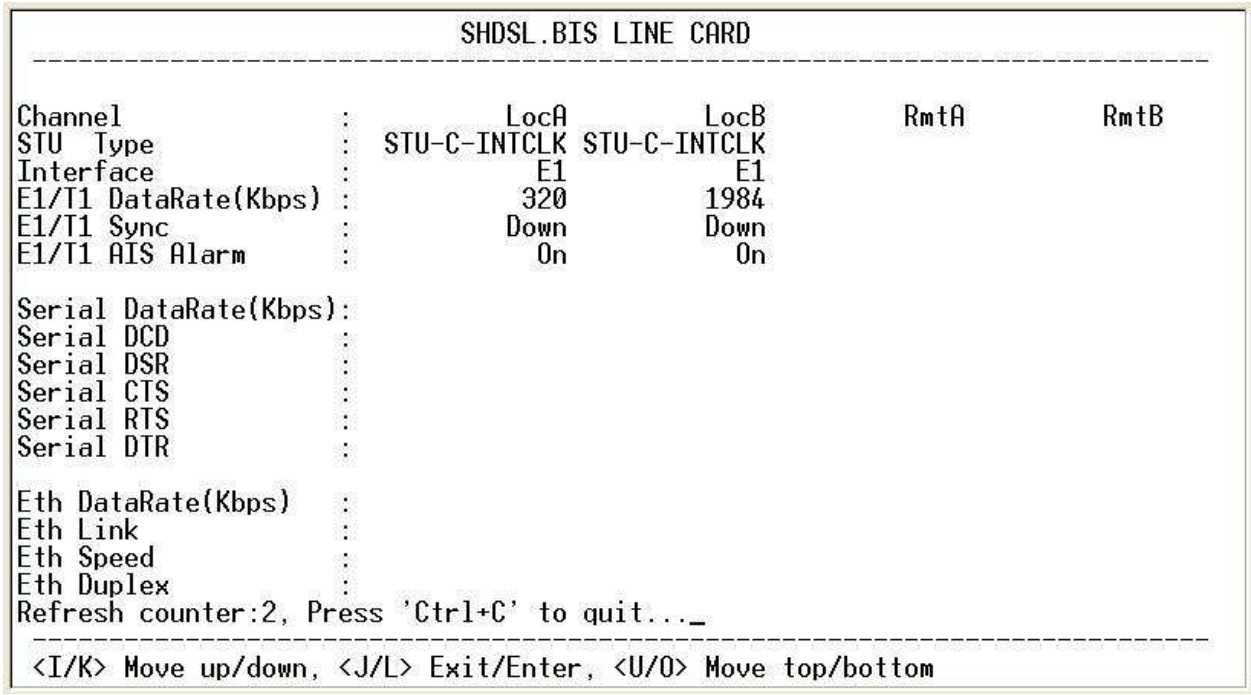
3.7.1 Shdsl

The shdsl status window will display a real-time status of the DSL for both channels and remote CPE if connected. The screen is refreshed every 2 seconds. The monitoring window displays the DSL line parameters, such as STU type, Line rate, SNR margin and attenuation. The lower half of the window displays the loopback and BER test status. While in this display mode the terminal window will not time out. To exit the window press CTRL-C.

```
                              SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
<Shdsl Status>
Channel                :            LocA          LocB          RmtA          RmtB
STU  Type              :  STU-C-INTCLK STU-C-INTCLK
DSL  Type              :     SHDSL.BIS     SHDSL.BIS
Line Rate(Kbps)        :             0             0
SNR Margin (dB)        :           0.0           0.0
Attenuation(dB)        :           0.0           0.0




Loopback State         :       Disable       Disable
Bert Test State        :       Disable       Disable
Bert Sync              :     Not Sync      Not Sync
Bert Error Count       :             0             0


Refresh counter:4, Press 'Ctrl+C' to quit...


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.7.2 Interface

The interface status window will display a real-time status of the interface for both channels and remote CPE if connected. The screen is refreshed every 2 seconds. The monitoring window displays the interface parameters, such as STU type, interface type, there have E1 parameters, Serial parameters or Ethernet parameters according which line card type to been used. While in this display mode the terminal window will not time out. To exit the window press CTRL-C.



3.7.3 Current Performance

```
                              SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
Shdsl Performance
Channel                :          LocA          LocB          RmtA          RmtB
Interface              :            E1            E1
Current 15Min  ES      :             0             0
               SES     :             0             0
               UAS     :           564           564
               LOSWS   :             0             0
Current 24Hour ES      :             0             0
               SES     :             0             0
               UAS     :           564           564
               LOSWS   :             0             0

E1/T1 Performance
Current 15Min  ES      :             0             0
               SES     :             0             0
               UAS     :           564           564
Current 24Hour ES      :             0             0
               SES     :             0             0
               UAS     :           564           564
Refresh counter:26, Press 'Ctrl+C' to quit...
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

3.7.4 Statistics

After returning to the Status Display main menu, use the down arrow key to select statistics. Press right arrow or ENTER.

```
                              SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
    Shdsl               Show SHDSL Status
    Interface           Show Interface Status
    Current Perf        Show Current Performamce
 >> Loc_statistics      Show Local Statistics
    Rmt_statistics      Show Remote Statistics
    clear               Clear Channel Statistics









 ------------------------------------------------------------------------------
 Command:Loc_statistics <CR>
 Message:



 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The statistics display window will display performance monitor data for the

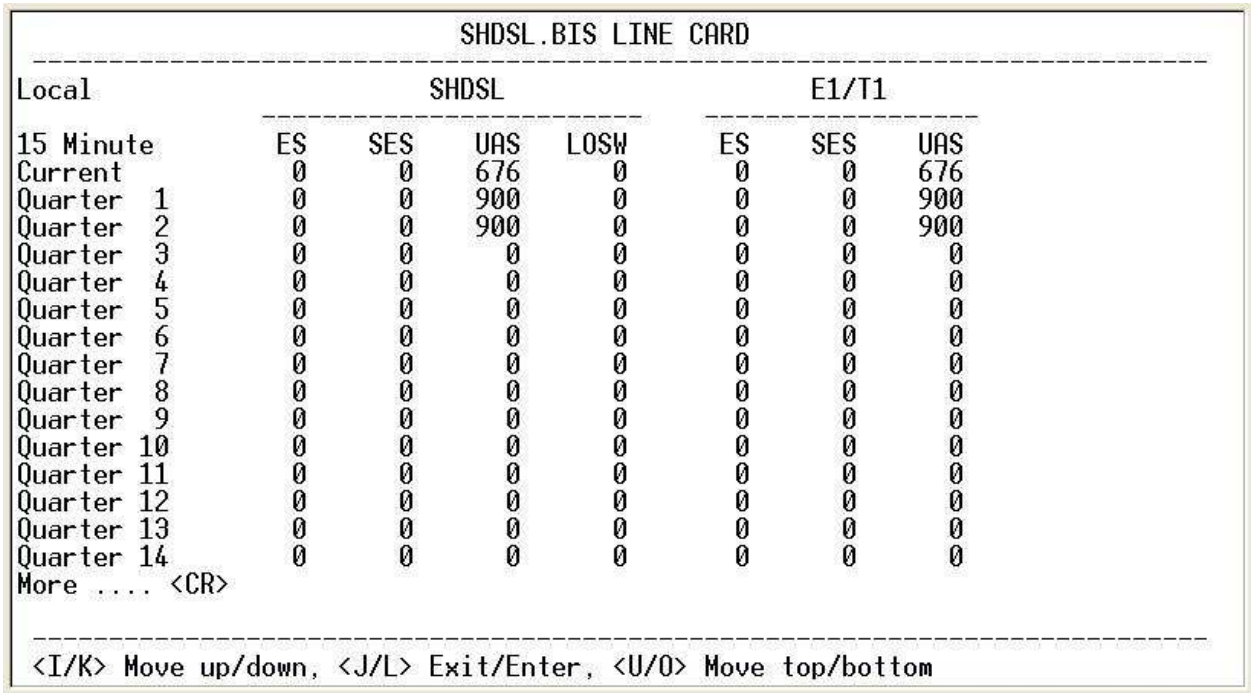
selected channel (A or B) and for the selected interval (15 minutes or 24 hours). The display will show the recorded results for the SHDSL.bis ES (error seconds), SES (severely errored seconds), UAS (unavailable seconds), and LOSW (loss of sync word) and for the G.703 E1/T1 ES (error seconds), SES (severely errored seconds), UAS (unavailable seconds).

Model vs. Interface modes and statistics support:

Model	Interface modes support	SHDSL statistics support ES ,SES,UAS,LOSW	E1 statistics support ES,SES,UAS
SHRM03bB	E1 interface	•	•
SHRM03b-V35	Series interface	•	
SHRM03b-ET100	Ethernet interface	•	
SHRM03b-T1	T1 interface	•	•

3.7.4.1 15 minutes interval

The performance monitor is capable of storing and retrieving performance information for each 15 minute (one quarter). The following screen shows the SHDSL.bis and E1 performance monitored on each 15 minute. The 15 minute display window will display all the performance information for each 15 minute interval in the current 24 hour period. There are a total of 96 intervals. Press the ENTER key to display the next page of intervals.


SHDSL.BIS LINE CARD
Local
SHDSL
E1/T1
15 Minute ES SES UAS LOSW ES SES UAS
Current 0 0 676 0 0 0 676
Quarter 1 0 0 900 0 0 0 900
Quarter 2 0 0 900 0 0 0 900
Quarter 3 0 0 0 0 0 0 0
Quarter 4 0 0 0 0 0 0 0
Quarter 5 0 0 0 0 0 0 0
Quarter 6 0 0 0 0 0 0 0
Quarter 7 0 0 0 0 0 0 0
Quarter 8 0 0 0 0 0 0 0
Quarter 9 0 0 0 0 0 0 0
Quarter 10 0 0 0 0 0 0 0
Quarter 11 0 0 0 0 0 0 0
Quarter 12 0 0 0 0 0 0 0
Quarter 13 0 0 0 0 0 0 0
Quarter 14 0 0 0 0 0 0 0
More .... <CR>
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

When using Series Interface and Ethernet Interface, there can only display the SHDSL.bis performance monitor data

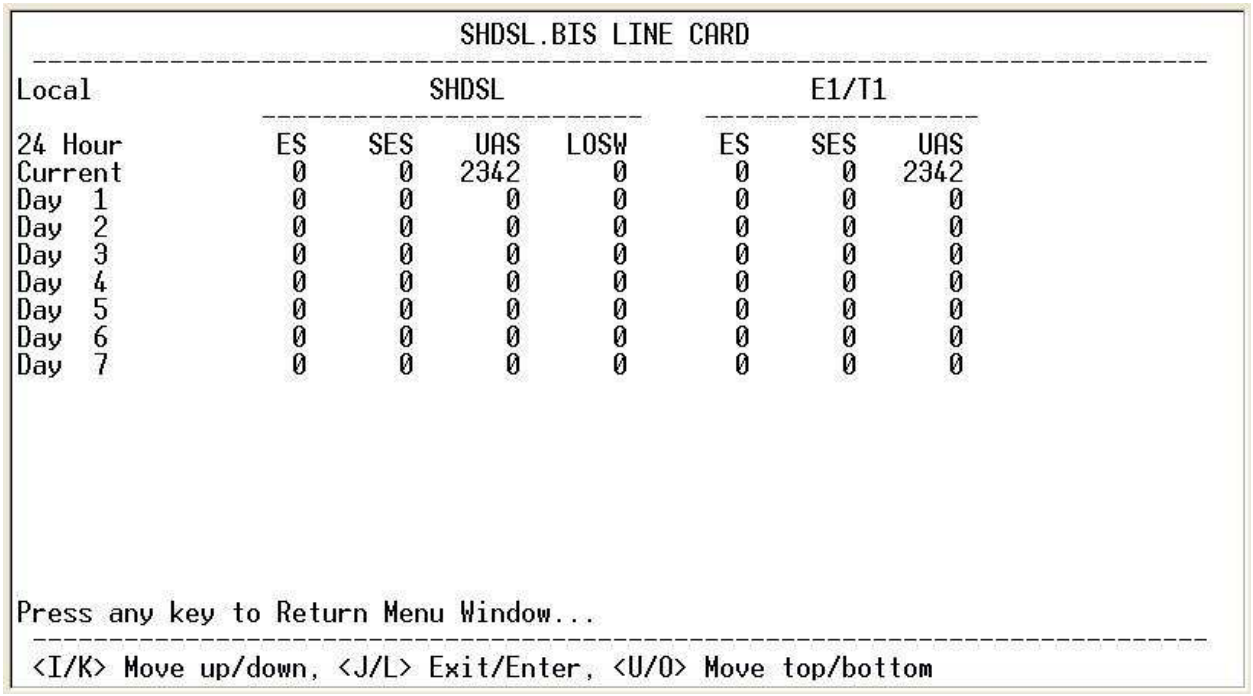
While in this display mode the terminal window will not timeout. The 15 minute display window will display all the performance information for each 15 minute interval in the current 24 hour period. There are a total of 96 intervals. Press the ENTER key to display the next page of intervals. To exit the window, press CTRL-C and then ENTER.

Quarter display on each page:

Page	Time display
1	Current and 1 to 14
2	quarter
3	Current and 15 to 28
4	quarter
5	Current and 29 to 42
6	quarter
7	Current and 43 to 56
	quarter
	Current and 57 to 70
	quarter
	Current and 71 to 84
	quarter
	Current and 85 to 96
	quarter

3.7.4.2 24 hours interval

The performance monitor is capable of storing and retrieving performance information for each 24 hour interval, up to 7 days. The following screen shows the SHDSL.bis and E1 performance monitored over 7 days.


SHDSL.BIS LINE CARD
Local
SHDSL
E1/T1
24 Hour ES SES UAS LOSW ES SES UAS
Current 0 0 2342 0 0 0 2342
Day 1 0 0 0 0 0 0 0
Day 2 0 0 0 0 0 0 0
Day 3 0 0 0 0 0 0 0
Day 4 0 0 0 0 0 0 0
Day 5 0 0 0 0 0 0 0
Day 6 0 0 0 0 0 0 0
Day 7 0 0 0 0 0 0 0
Press any key to Return Menu Window...
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

When using Series Interface and Ethernet Interface, there can only display the SHDSL.bis performance monitor data

Press any key to leave this menu and go back to the Status Display menu.

3.7.5 Clear

From the Status Display menu, use the down arrow key to select the clear channel statistics menu item. You may clear the performance statistics for either Local or Remote side B. After selecting the channel, the data will be cleared with no further warning.

```
                              SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   Shdsl                Show SHDSL Status
   Interface            Show Interface Status
   Current Perf         Show Current Performamce
   Loc_statistics       Show Local Statistics
   Rmt_statistics       Show Remote Statistics
>> clear                Clear Channel Statistics









--------------------------------------------------------------------------------
Command:clear <CR>
Message: Please input the following information.

Input the channel to clear (TAB Select) <Local>: Local


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

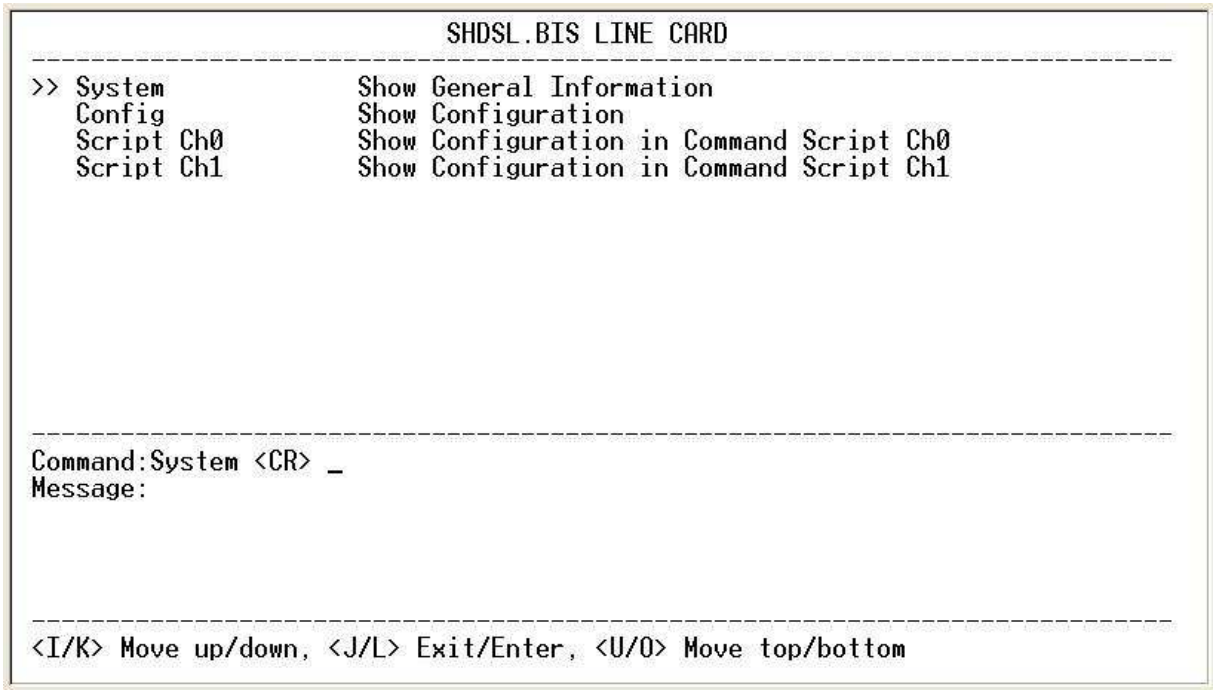
3.8 Show

The following is an example of the "Show" menu command. Use the down menu key "K" or down cursor key and place the cursor on the "show" command.

```
                              SHDSL.BIS LINE CARD
--------------------------------------------------------------------------------
   setup                Configure system
   status               Show running system status
>> show                 View system configuration
   reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system









--------------------------------------------------------------------------------
Command:show <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

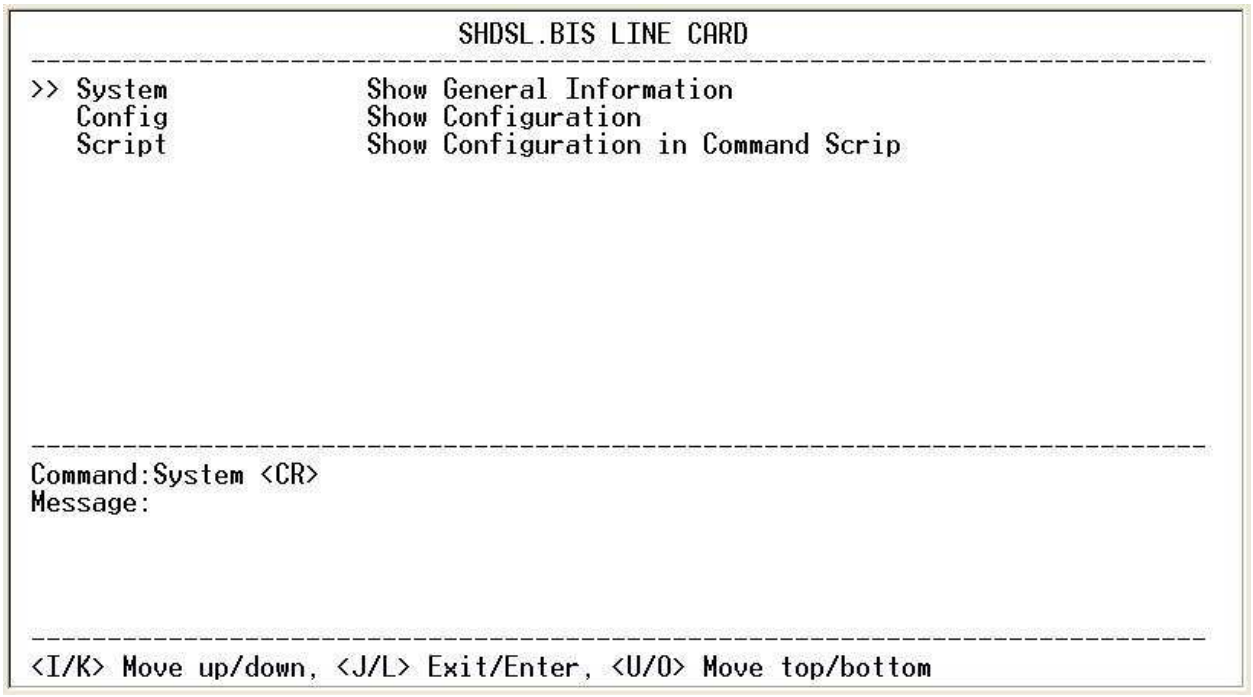
With the cursor on the "show" command, press the right cursor key, "J" key or press ENTER to go to the next sub menu. The following screen will display:

For two wires mode:


SHDSL.BIS LINE CARD
>> System Show General Information
Config Show Configuration
Script Ch0 Show Configuration in Command Script Ch0
Script Ch1 Show Configuration in Command Script Ch1
Command:System <CR> _
Message:
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

Script Ch0 and script Ch1 are meaning channel A and channel B by using script format.

For four wires mode:



3.8.1 System

Our cursor is already on the "show system" command, so press ENTER and the following screen will display the general system information.

```
                              SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
<System Info Window>

                  Local Side         Remote Side Ch1        Remote Side Ch2
                 ================   ====================  ====================
 Model          : 3030B
 Sw Version     : 1.14.4
 FPGA Version   : 0.09
 CPU            : Winbond W90N740
 RAM            : 8MB
 FLASH          : 2MB
 Dsp Version    : 1.1-1.5.5__003
 SerialNo       : CKPKF2UA0001
 System MCSV    : 0CE9-0000-114DBE5D
 Kernel MCSV    : 0CE4-0000-114DBE5D
 FPGA   MCSV    : 0CE4-0000-0091613C

 System Live Time  : 0 Day/ 0Hour/ 1Min /20 Secs



 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Most of the information on this screen is either self explanatory or it is simply irrelevant for the end user. However, two items, the Kernel and FPGA (Field Programmable Gate Array) version will give the software and hardware versions respectively of the line card. These are important to know in case new firmware becomes available in the future to add extra functions of to fix unknown bugs from the original manufactured equipment. Please make note of the Kernel MCSV and FPGA MCSV items in the above screen. These show the Kernel and FPGA versions as follows:
114 means version 1.14
009 means version 0.09
Upgrading the line cards is done through the terminal connection with the Xmodem protocol. The upgrade procedure will be explained in detail later in this manual.

3.8.2 Config

It can display the all configuration value of this line card. The following show all models' configuration page and their default values. When using 2 wire mode, there have two channel's data been displayed as the page.

3.8.2.1 E1 interface 2 wire mode

```
                              SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :              E1              E1
setup Type                  :   STU-C-INTCLK    STU-C-INTCLK
setup Shdsl Annex           :         Annex-G         Annex-G
setup Shdsl Psd             :             SYM             SYM
setup Shdsl Margin          :               0               0
setup Shdsl Pair Mode       :          1 Pair          1 Pair
setup E1 Channel            :          PCM31C          PCM31C
setup E1 Pass Through       :             Off             Off
setup E1 Slot Number        :              31              31
setup E1 First Slot         :               1               1
setup E1 Code               :            HDB3            HDB3
setup E1 AIS                :              On              On
setup E1 Build Outs         :         120 Ohm         120 Ohm

Press any key to Return Menu Window...
```

3.8.2.2 E1 interface 4 wire mode

```
                              SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :              E1
setup Type                  :   STU-C-INTCLK
setup Shdsl Annex           :         Annex-G
setup Shdsl Psd             :             SYM
setup Shdsl Margin          :               0
setup Shdsl Pair Mode       :          2 Pair
setup E1 Channel            :          PCM31C
setup E1 Pass Through       :             Off
setup E1 Slot Number        :              30
setup E1 First Slot         :               1
setup E1 Code               :            HDB3
setup E1 AIS                :              On
setup E1 Build Outs         :         120 Ohm

Press any key to Return Menu Window...
```

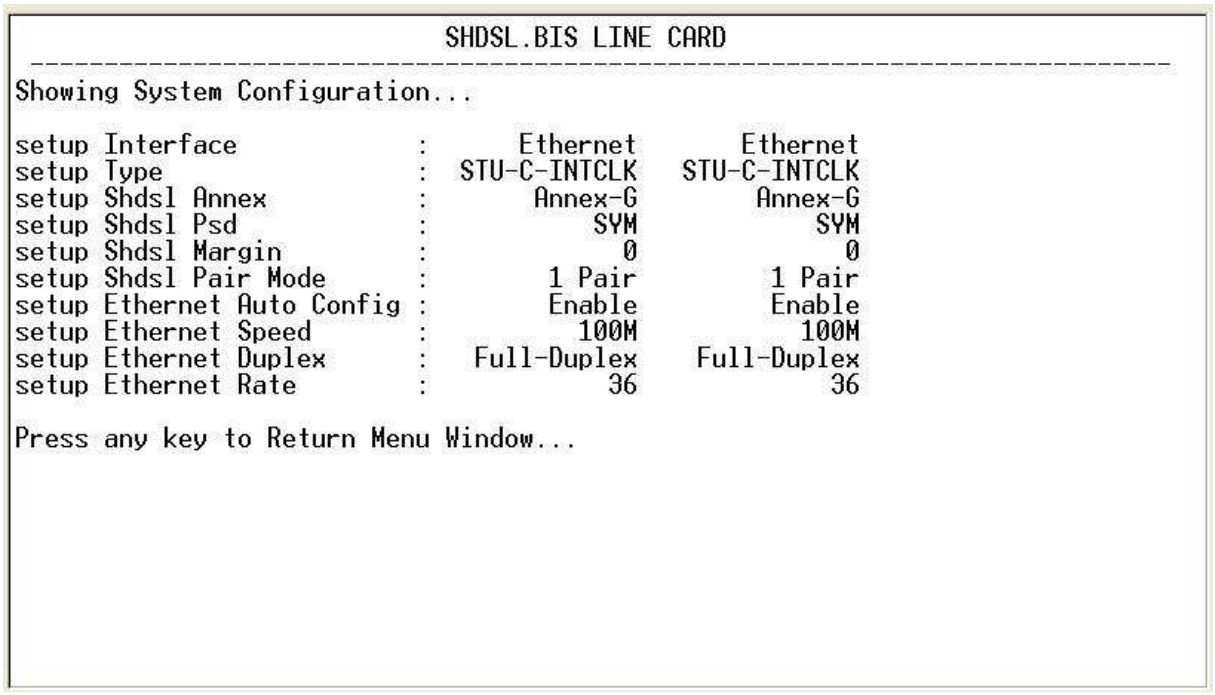
3.8.2.3 Series interface 2 wire mode

```
                          SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :        Serial         Serial
setup Type                  :  STU-C-INTCLK   STU-C-INTCLK
setup Shdsl Annex           :       Annex-G        Annex-G
setup Shdsl Psd             :           SYM            SYM
setup Shdsl Margin          :             0              0
setup Shdsl Pair Mode       :        1 Pair         1 Pair
setup Serial Interface      :           V35            V35
setup Serial Data Rate      :            32             32
setup Serial Clock          :        normal         normal
setup Serial Data           :        normal         normal
setup Serial Rts            :            on             on
setup Serial Cts            :       from_rts       from_rts
setup Serial Dsr            :            on             on
setup Serial Dcd            :       from_dsl       from_dsl
setup Serial Delay          :             3              3

Press any key to Return Menu Window...
```

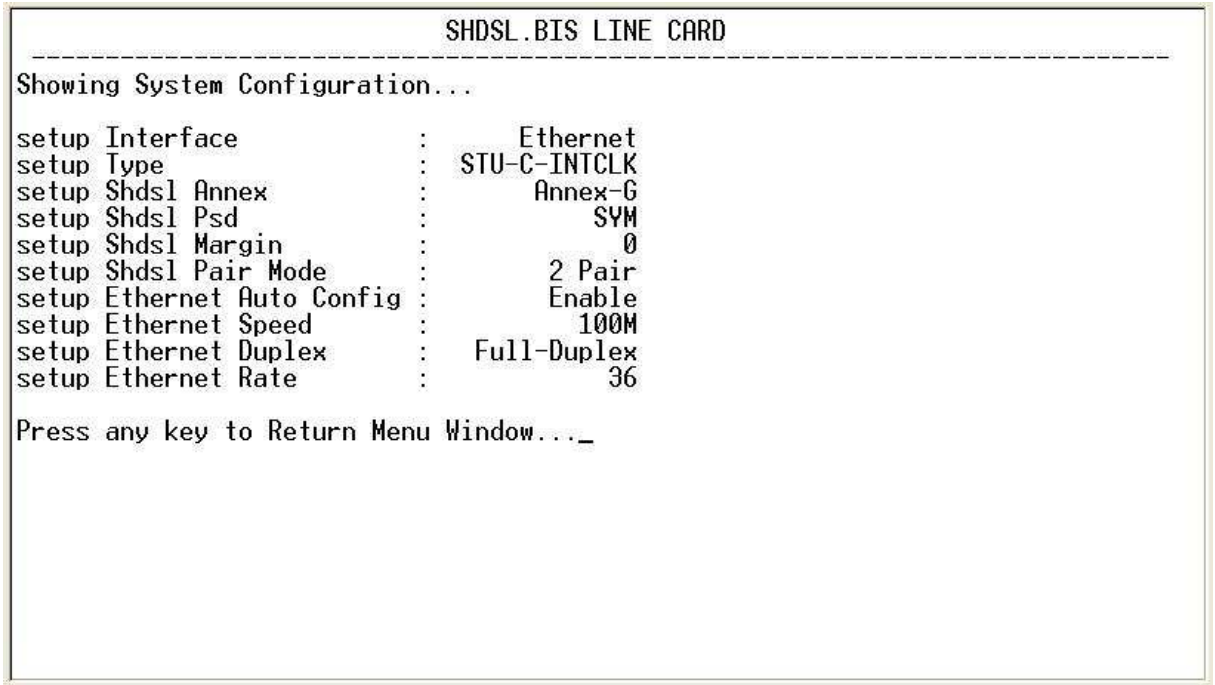
3.8.2.4 Series interface 4 wire mode

```
                          SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :        Serial
setup Type                  :  STU-C-INTCLK
setup Shdsl Annex           :       Annex-G
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :             0
setup Shdsl Pair Mode       :        2 Pair
setup Serial Interface      :           V35
setup Serial Data Rate      :            32
setup Serial Clock          :        normal
setup Serial Data           :        normal
setup Serial Rts            :            on
setup Serial Cts            :       from_rts
setup Serial Dsr            :            on
setup Serial Dcd            :       from_dsl
setup Serial Delay          :             3

Press any key to Return Menu Window...
```

3.8.2.5 Ethernet interface 2 wire mode


SHDSL.BIS LINE CARD
Showing System Configuration...
setup Interface : Ethernet Ethernet
setup Type : STU-C-INTCLK STU-C-INTCLK
setup Shdsl Annex : Annex-G Annex-G
setup Shdsl Psd : SYM SYM
setup Shdsl Margin : 0 0
setup Shdsl Pair Mode : 1 Pair 1 Pair
setup Ethernet Auto Config : Enable Enable
setup Ethernet Speed : 100M 100M
setup Ethernet Duplex : Full-Duplex Full-Duplex
setup Ethernet Rate : 36 36
Press any key to Return Menu Window...

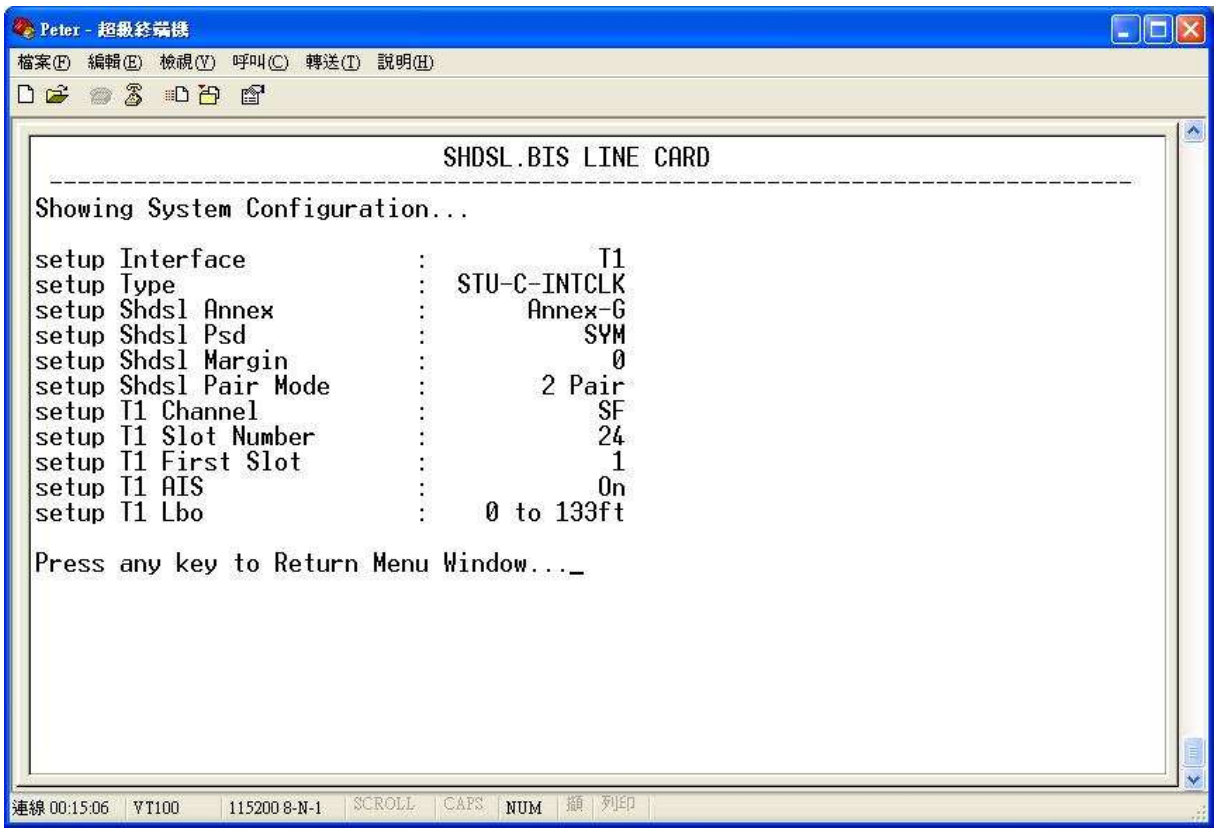
3.8.2.6 Ethernet interface 4 wire mode


SHDSL.BIS LINE CARD
Showing System Configuration...
setup Interface : Ethernet
setup Type : STU-C-INTCLK
setup Shdsl Annex : Annex-G
setup Shdsl Psd : SYM
setup Shdsl Margin : 0
setup Shdsl Pair Mode : 2 Pair
setup Ethernet Auto Config : Enable
setup Ethernet Speed : 100M
setup Ethernet Duplex : Full-Duplex
setup Ethernet Rate : 36
Press any key to Return Menu Window..._

3.8.2.7 T1 interface 2 wire mode

```
                              SHDSL.BIS LINE CARD
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface              :              T1              T1
setup Type                   :   STU-C-INTCLK    STU-C-INTCLK
setup Shdsl Annex            :         Annex-G         Annex-G
setup Shdsl Psd              :             SYM             SYM
setup Shdsl Margin           :               0               0
setup Shdsl Pair Mode        :          1 Pair          1 Pair
setup T1 Channel             :              SF              SF
setup T1 Slot Number         :              24              24
setup T1 First Slot          :               1               1
setup T1 AIS                 :              On              On
setup T1 Lbo                 :     0 to 133ft      0 to 133ft

Press any key to Return Menu Window..._
```

3.8.2.8 T1 interface 4 wire mode

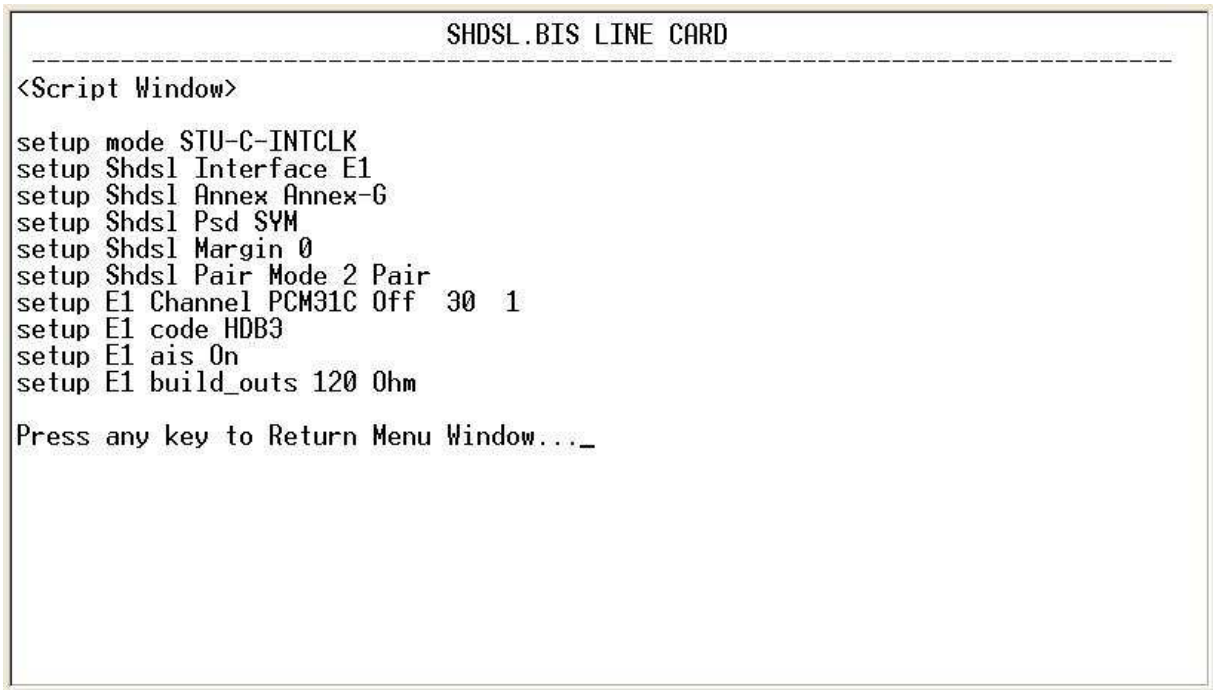


3.8.3 Script

It can display the all configuration value of this line card with using Script command format.

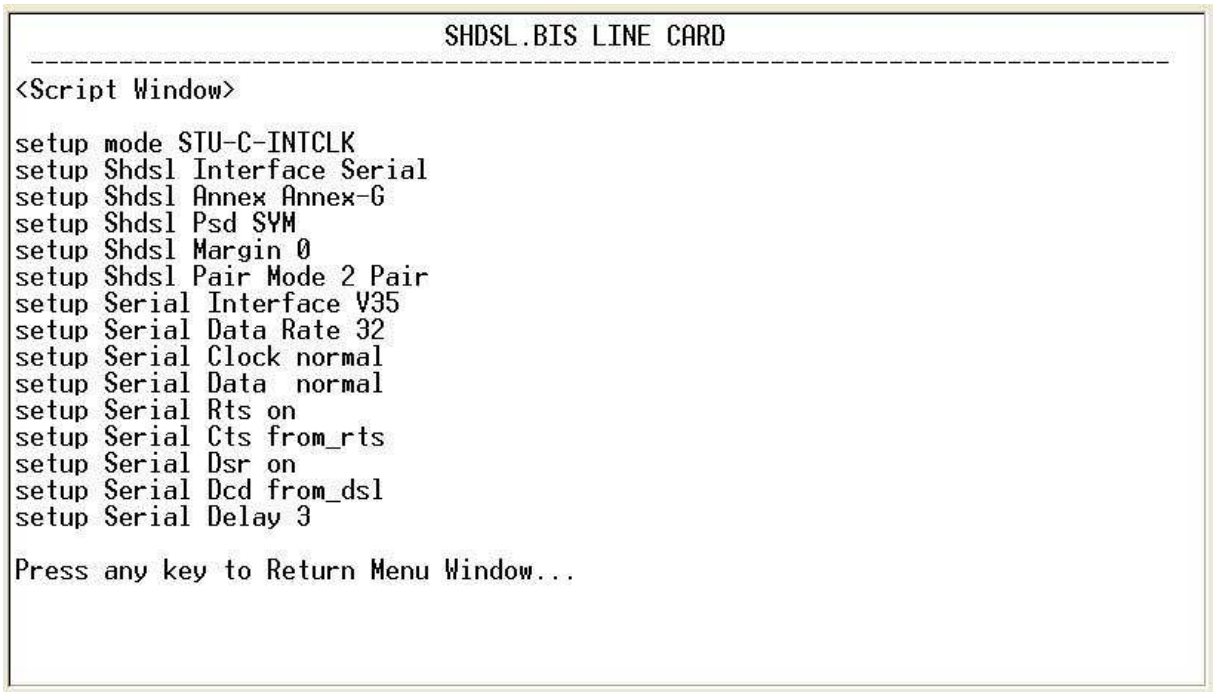
3.8.3.1 E1 interface

For E1 interface model:


SHDSL.BIS LINE CARD
<Script Window>
setup mode STU-C-INTCLK
setup Shdsl Interface E1
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup Shdsl Pair Mode 2 Pair
setup E1 Channel PCM31C Off 30 1
setup E1 code HDB3
setup E1 ais On
setup E1 build_outs 120 Ohm
Press any key to Return Menu Window..._

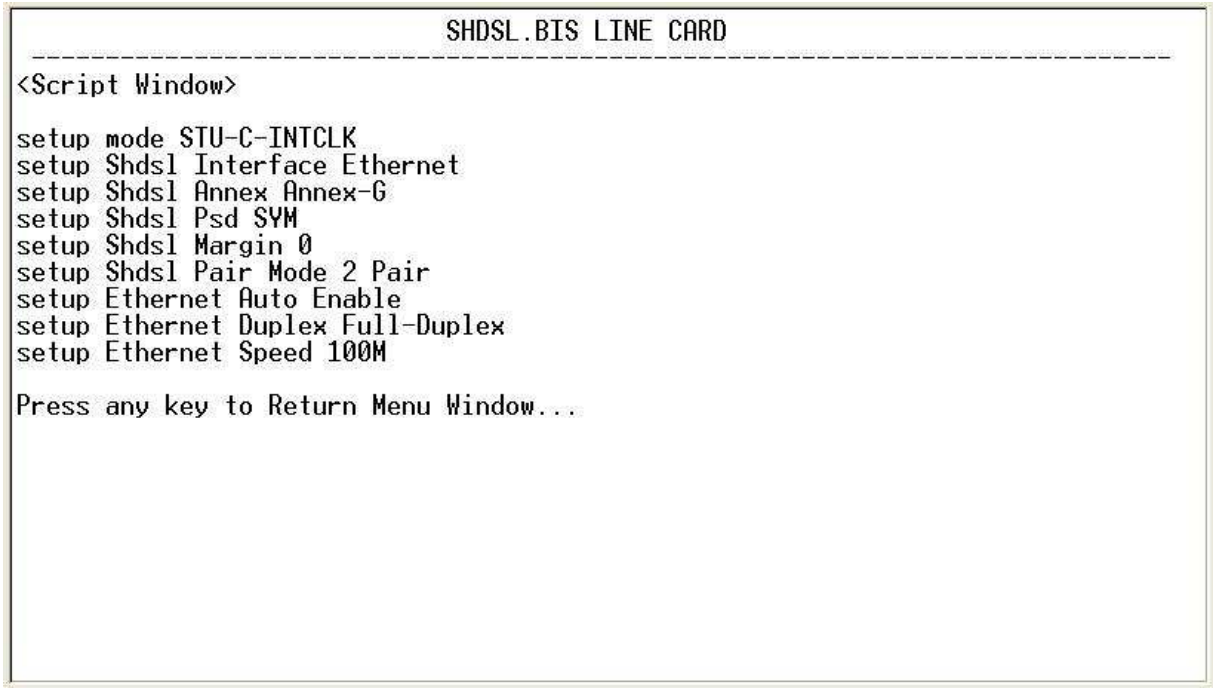
3.8.3.2 Serial interface

For Serial interface model:


SHDSL.BIS LINE CARD
<Script Window>
setup mode STU-C-INTCLK
setup Shdsl Interface Serial
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup Shdsl Pair Mode 2 Pair
setup Serial Interface V35
setup Serial Data Rate 32
setup Serial Clock normal
setup Serial Data normal
setup Serial Rts on
setup Serial Cts from_rts
setup Serial Dsr on
setup Serial Dcd from_dsl
setup Serial Delay 3
Press any key to Return Menu Window...

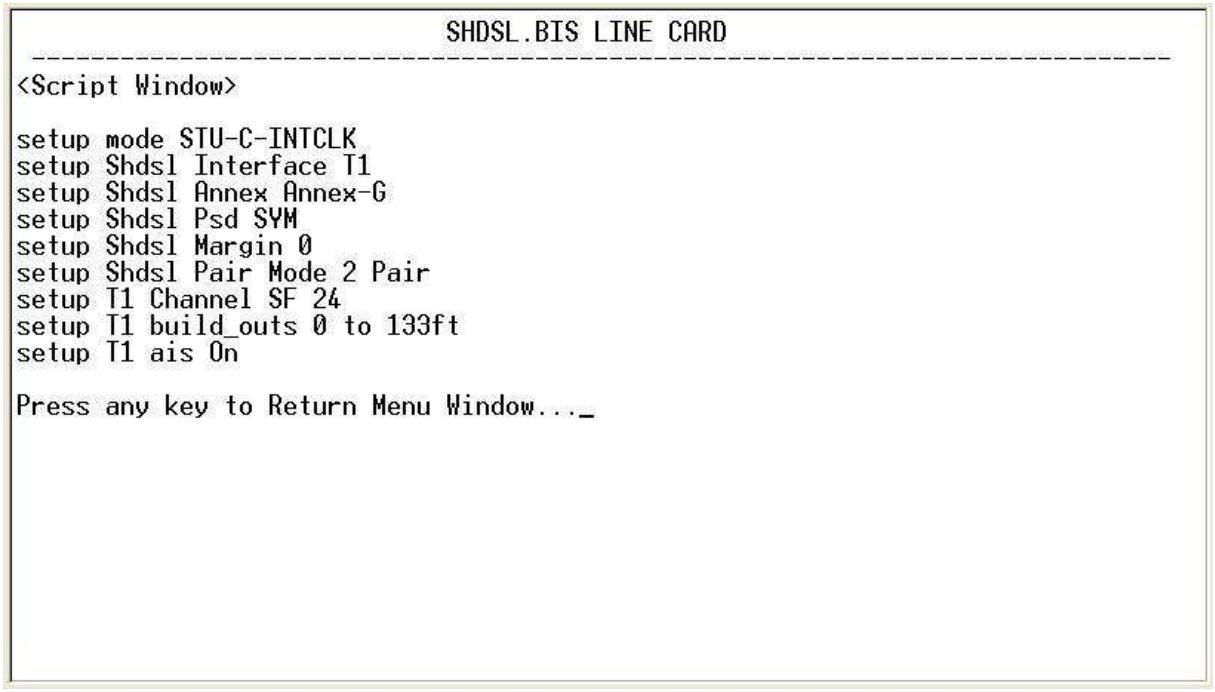
3.8.3.3 Ethernet interface

For Ethernet interface model:


SHDSL.BIS LINE CARD
<Script Window>
setup mode STU-C-INTCLK
setup Shdsl Interface Ethernet
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup Shdsl Pair Mode 2 Pair
setup Ethernet Auto Enable
setup Ethernet Duplex Full-Duplex
setup Ethernet Speed 100M
Press any key to Return Menu Window...

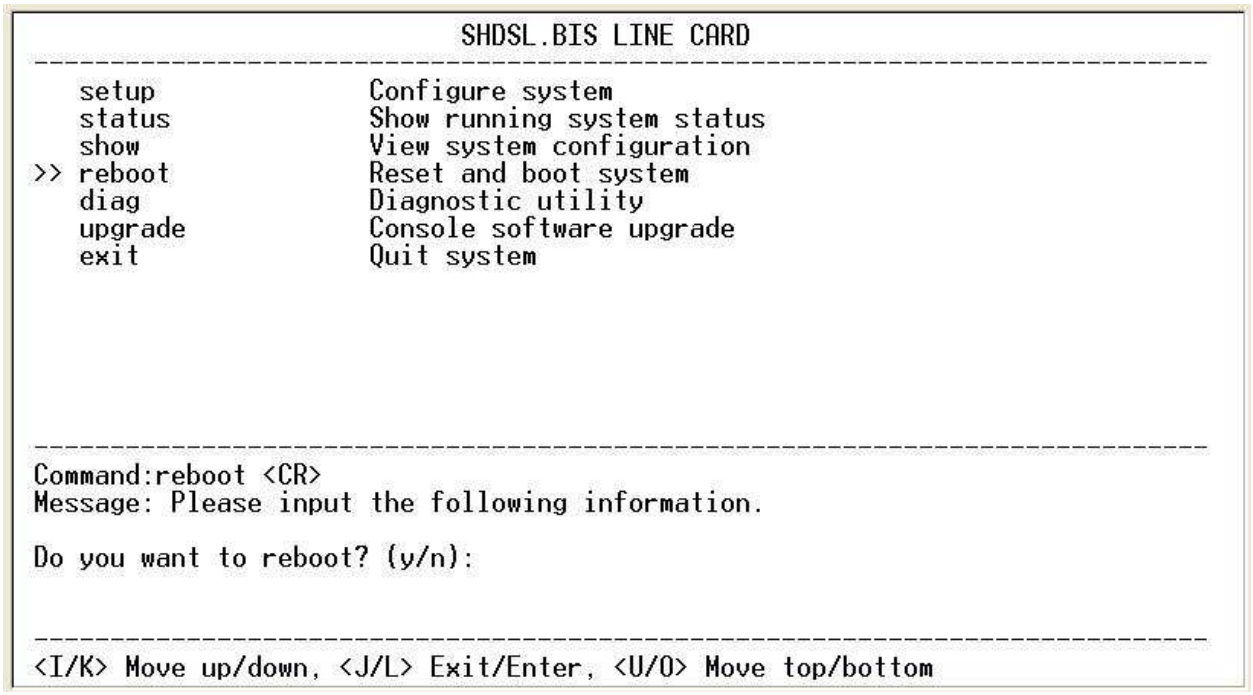
3.8.3.4 T1 interface

For T1 interface model:


SHDSL.BIS LINE CARD
<Script Window>
setup mode STU-C-INTCLK
setup Shdsl Interface T1
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup Shdsl Pair Mode 2 Pair
setup T1 Channel SF 24
setup T1 build_outs 0 to 133ft
setup T1 ais On
Press any key to Return Menu Window..._

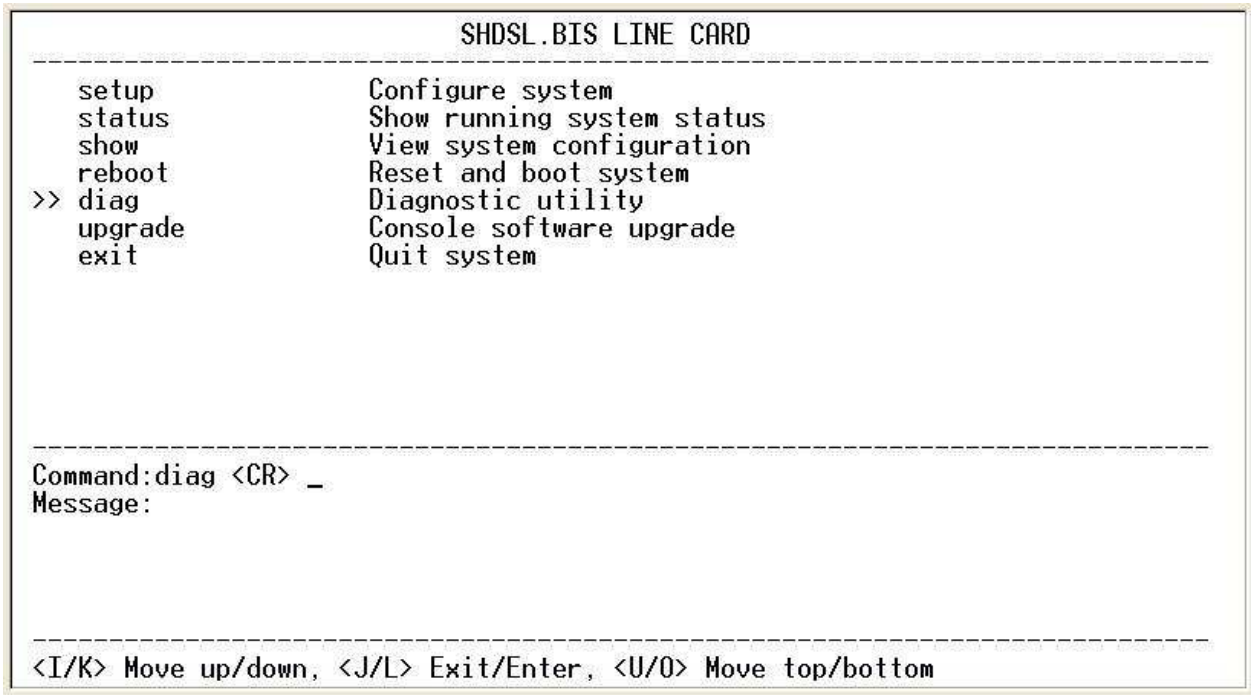
3.9 Reboot

This is a very basic function that needs no further explanation, select it and the line card will reboot after confirming.


SHDSL.BIS LINE CARD
setup Configure system
status Show running system status
show View system configuration
>> reboot Reset and boot system
diag Diagnostic utility
upgrade Console software upgrade
exit Quit system
Command:reboot <CR>
Message: Please input the following information.
Do you want to reboot? (y/n):
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

3.10 Diag

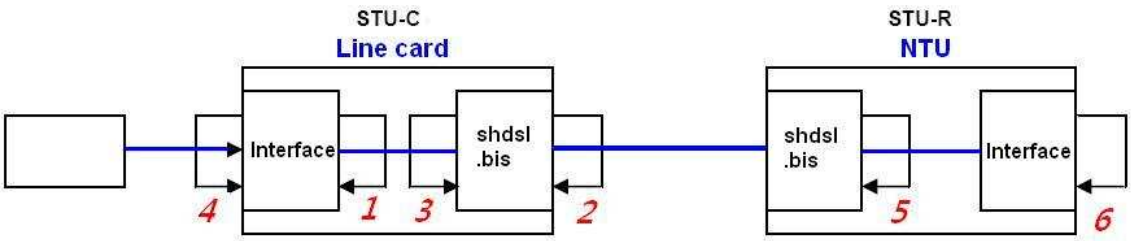
The diagnostics features of the line card include loop back and Bit Error Rate functions. From the main menu move the cursor down to the 'diag' option.



3.10.1 Select Loop back type

The loop back types supported include local digital, local, remote line, remote payload, far end line, and far end payload loop backs. When line card doesn't connect to other remote side NTU,
There can display and supported include local digital, local, remote line, remote payload loop backs.

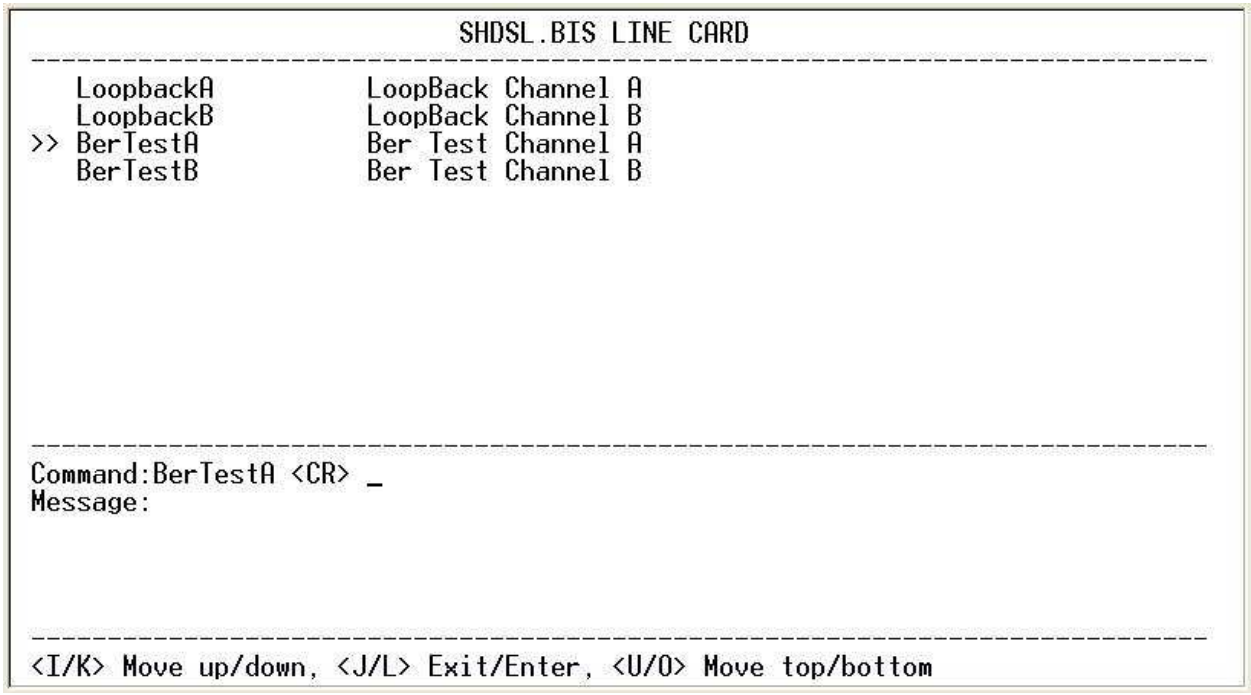
3.10.2 Loop back types defined



1 Local Digital Loopback
2 Local Loopback
3 Remote Line Loopback
4 Remote Payload Loopback
5 Far End Line Loopback
6 Far End Payload Loopback

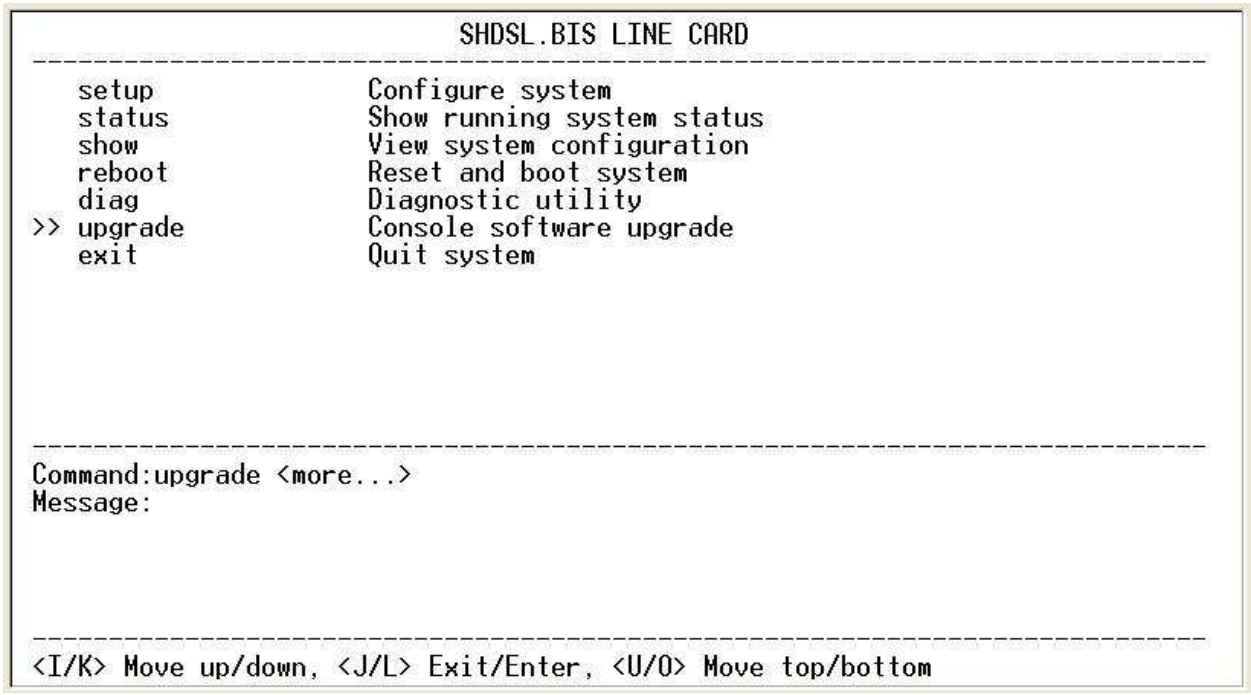
3.10.3 Select BERT pattern

The line card has a built-in Bit Error Rate Test generator that generates a standard 2047 (211-1) test pattern. When using 2-wire SHDSL.bis configuration, the generator can be activated for channel A or B from the menu.



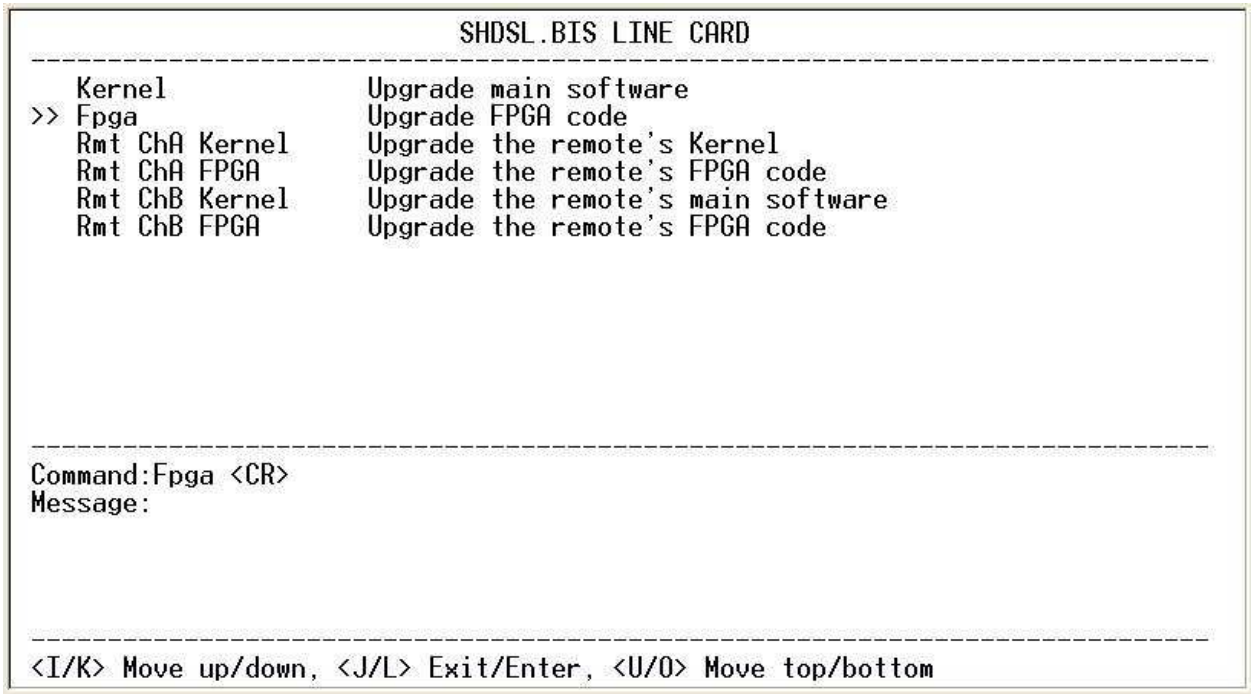
3.11 Upgrade

Occasionally we may release code to upgrade the function of or fix some bug discovered after our initial production.
The line cards all have the ability to upgrade the code without changing any components or removing cards. Of course during upgrade and re-flash, the normal transmissions will be halted, so the upgrade should be done when the system is taken offline or done during a time of extremely low impact to the customer's line (like in the middle of the night). The upgrade process uses the Xmodem protocol via the line card's serial console port.

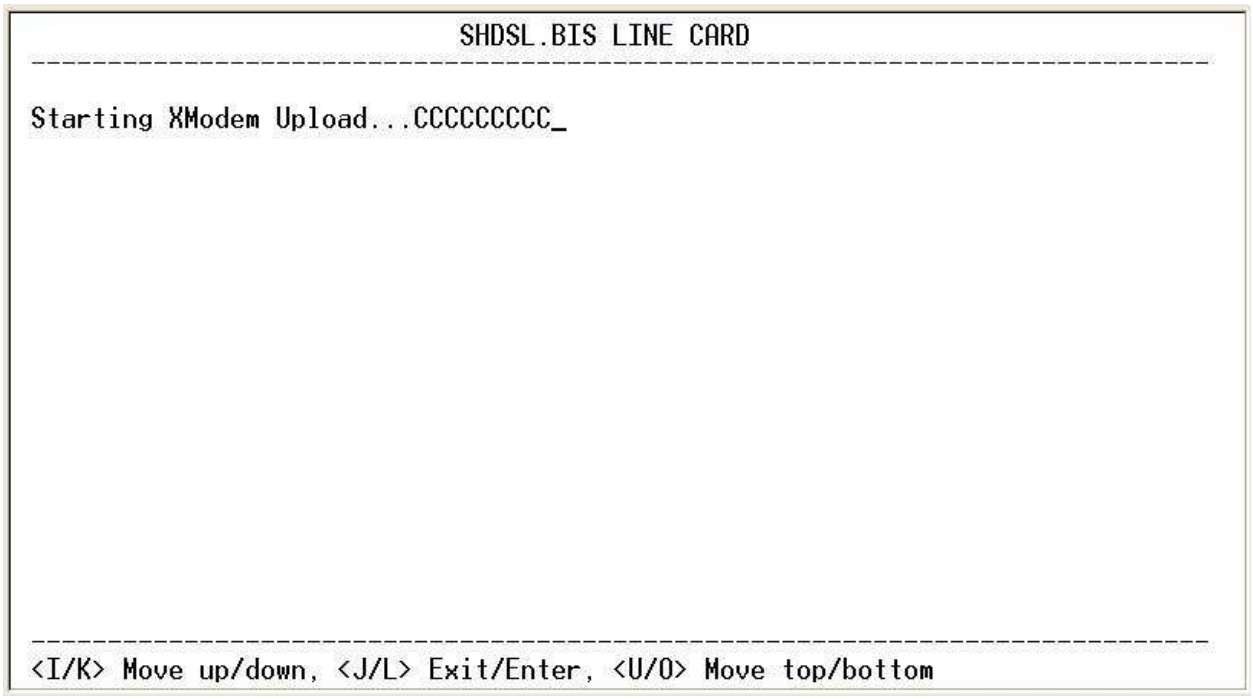


3.11.1 Upgrade the FPGA

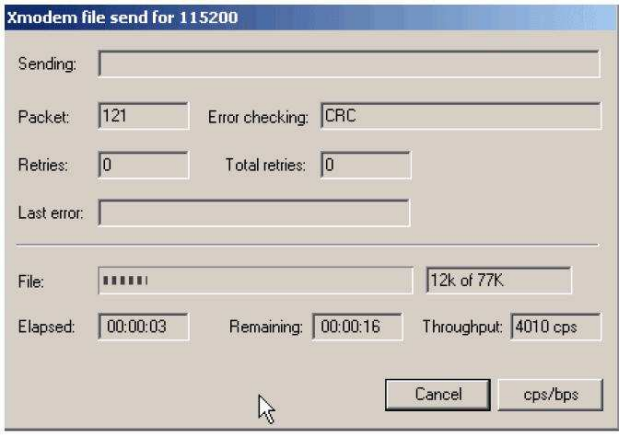
The hardware in the line card can be upgrade if new functions are added at a later time. The line card incorporates a Field Programmable Gate Array to control the line card's logic. To upgrade the code, choose the 'Upgrade FPGA code' option from the menu.


SHDSL.BIS LINE CARD
Kernel Upgrade main software
>> Fpga Upgrade FPGA code
Rmt ChA Kernel Upgrade the remote's Kernel
Rmt ChA FPGA Upgrade the remote's FPGA code
Rmt ChB Kernel Upgrade the remote's main software
Rmt ChB FPGA Upgrade the remote's FPGA code
Command:Fpga <CR>
Message:
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

Press Enter to enable the reception of Xmodem protocol.



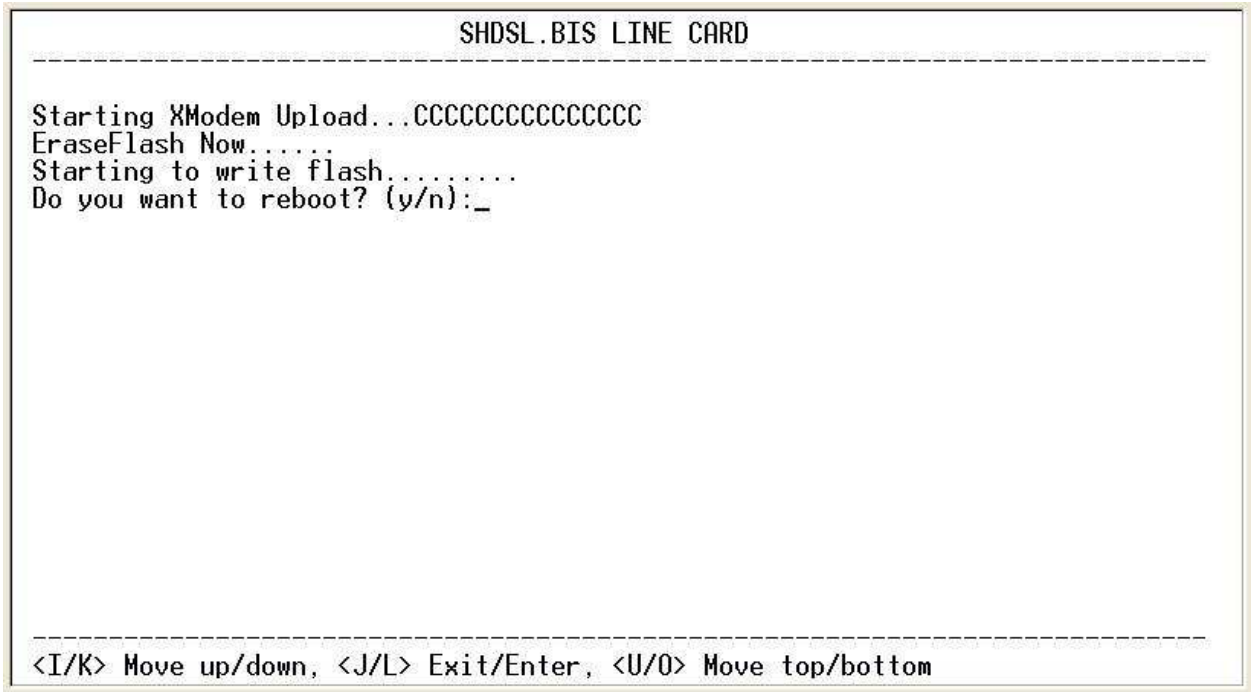
If you are using the HyperTerminal program in Windows, select the "Transfer" pull down menu and select "Send File".
Now browse to the location of the binary file and select the FPGA upgrade file.
Make sure the sending protocol is Xmodem and send the file.



The binary file is uploaded to the RAM in the line card with CRC error checking provided by the Xmodem protocol.
Once the upload is complete, all that is required is to make the final confirmation to erase and re-write the flash with the new binary code.

WARNING!: Do not allow any interruption of power during the erase and re-write
operation or the Flash will be left in an unknown state and the line card will no longer be able

to function. The line card must then be returned to the factory for repair.

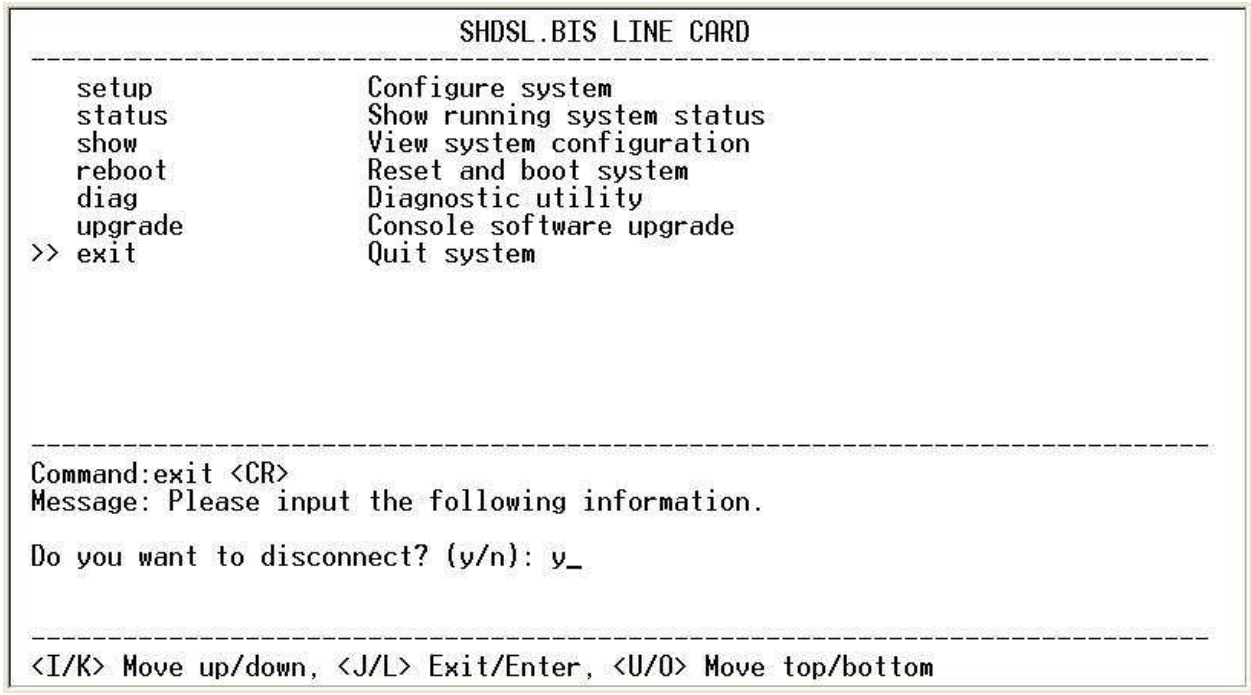


3.11.2 Upgrade the Kernel

To upgrade the kernel (software) follow exactly the same procedure and select 'kernel' from the upgrade menu. Use the binary file for the kernel to send from the HyperTerminal window.

3.12 Exit

To exit the console configuration mode, cursor down to 'exit' and press Enter. Answer y(es) to confirm.


SHDSL.BIS LINE CARD
setup Configure system
status Show running system status
show View system configuration
reboot Reset and boot system
diag Diagnostic utility
upgrade Console software upgrade
>> exit Quit system
Command:exit <CR>
Message: Please input the following information.
Do you want to disconnect? (y/n): y
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

4 Network Management System (NMS)

4.1 Overview

This chapter describes the Network Management System (NMS) used to access statistical, configuration and management through a Hyper Terminal/Telnet/Web Browser with real time monitoring & trap alarm in window graphic mode

CTC Union develops a perfect solution for the network managements. The intelligent NMS provides the support that the network manager needs. It consists of three modes:

1. Hype Terminal mode: Configuration by local RS-232 serial Console port of SNMP card
2. Telnet mode: Configuration by 10/100 Ethernet LAN port of SNMP card
3. Web-based mode: Configuration by 10/100 Ethernet LAN port of SNMP card

CTC Union's network management systems support various important functions :

1. Fault management - correlates fault management data from all network devices, isolates faults and initiates recovery actions
2. Configuration management
3. Performance management

Features

- View which type of cards occupy the chassis slots
- Full Read/ Write capabilities
- Enable/ Disable individual cards or channels
- Alarm detection for each card, power module
- Cards maintain their configuration even if the Management Module fails
- Using Windows GUI (Graphical User Interface)
- Configuration settings up or download to/from management PC
- Loop-back test capability
- Get CPE status of remote NTU side

4.1.1 System Requirements

The following are required for use of the NMS:

Hardware:

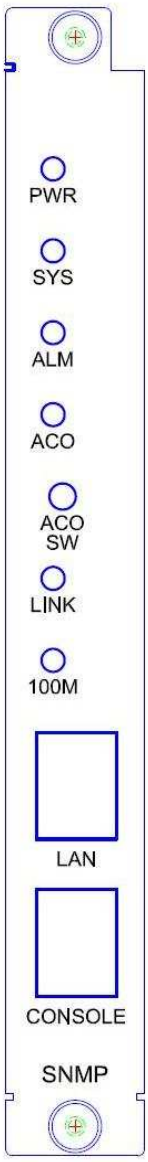
- RJ-45 to DB-9(F) Console cable
- RJ-45 to RJ-45 Ethernet Cable

  Required for establishing a direct connection from the SNMP card of rack mount shelf to a web server

Software:

- Hyper Terminal
- Telnet
- Web Browser (IE etc.)

4.1.2 View of front Panel on SNMP card



LEDs status of Reset bottom of SNMP card:

Items	LEDs	Color	Active	Description
Power	PWR	Green	On	Power supply is connected
System	SYS	Green	Flash	The system is working
Alarm Status	ALM	Red	On	Any failure on line card or power supply card
			Off	No alarm
ACO Status	ACO	Green	On	When audible alarm is inactive
			Off	No audible alarm
Ethernet Interface status	LINK	Green	On	LAN port connected
			Blink	Transmit or received data over Ethernet
			Off	LAN port is disconnected
	100M	Green	On	LAN port connect with 100M NIC
			Off	LAN port acts in 10M or LAN port is no connect

[ACO] Alarm Cut-Off

When alarm status is active, audible and visuable alarm output are On. If the user want to turn off the audio alarm, please press the **ACO SW** bottom. It will turn "ACO"LED off and turn audible alarm off.

[Aud.] Audible Alarm Output

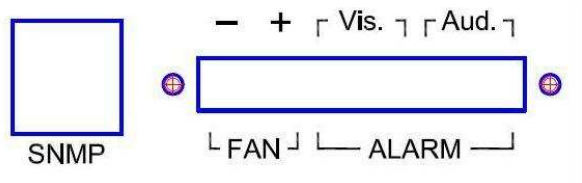
If there are alarm triggered and ACO is inactive. It will be turn the audible relay on, otherwise turn off.

If ACO is active and new alarm is triggered, it will be turn the audible relay on again. It show that the other alarm status been found.

[Vis.] Visuable Alarm Output

If there are alarm triggered, it will be turn the visuable relay on; otherwise turn off.

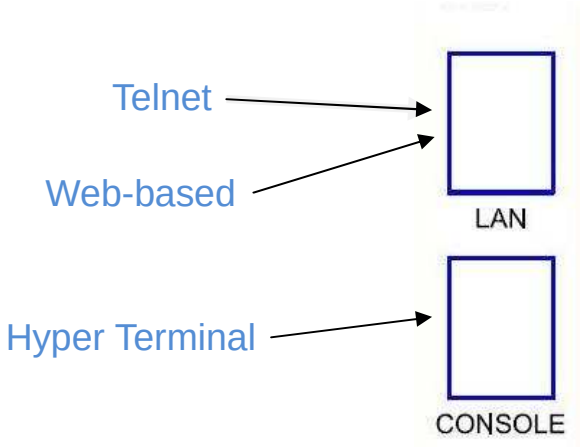
Rear Panel view of SNMP card:



4.2 Operation Mode for SNMP card

User can use one of three operation mode of the following:

Operation Mode	Port	Usage of Cable
Hyper Terminal	Console	DB9F to RJ-45 serial Cable
Telnet	LAN	Ethernet cable
Web-based	LAN	Ethernet cable



4.2.1.1 Hyper Terminal mode

Configuration by local RS-232 serial port of SNMP card by Hyper terminal

The console port of SNMP card is a RJ-45 connector labeled Console on the card face.
The is an RS-232 asynchronous console terminal port designed to facilitate setup of all parameters through the use of a standard text based terminal or any terminal emulation program running on a Personal Computer.

You can manage the Line Card locally by connecting the console port to a PC or workstation with terminal emulation software. After the physical connection is made, you are ready to configure the SNMP Card. Make sure you have connected the supplied RS-232 serial cable (DB9F to RJ-45 Plug) to the console port on the front panel of SNMP Card.

Run a terminal emulation program (such as HyperTerminal) with the following settings:
Emulation: VT-100 compatible
Band rate: 115200, Data bits: 8, Parity: None, Stop Bits: 1, Flow Control: None

4.2.1.2 Telnet mode

Configuration by LAN port of SNMP card by Telnet

The Console (Management) port does not have switching capabilities; its main purpose is to allow a direct PC connection for SNMP and NMS access. A direct connection with the console port may also be used to access the management system with Command Line Interface (CLI) via Telnet.
The 10/100 Ethernet management port auto-negotiates speed and duplex mode; these
Configuration cannot be set on the rack mount shelf. For the best configuration results, your PC should be set to auto-negotiate speed and duplex mode as well. If your PC cannot be configured to auto-negotiate, speed may be set at either 10 Mbps or 100 Mbps but duplex mode must be set to Half Duplex; a 10/100BaseT Ethernet MGMT connection cannot be made if your PC is set to Full Duplex.
Using a straight-through or cross over Ethernet cable, connect your PC to the Ethernet RJ45 management port on the front of the LAN connector of SNMP card.
The LINK LED will illuminate green to indicate an Ethernet connection has been established.

4.2.1.3 Web-based mode

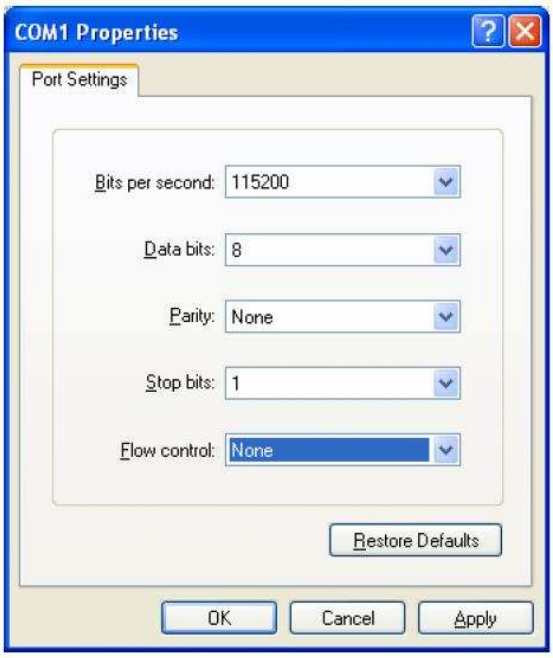
Configuration by LAN port of SNMP card by Web browser
The Ethernet cable connection like as above. Configuration is by web browser. Compatible web browsers include Microsoft Internet Explorer (version 4.0 or higher) and Netscape Navigator (version 4.0 or higher). NMS is optimized for use with Internet Explorer.
Use your browser's default settings when running NMS. JavaScript must be enabled. Set your screen resolution to 1024 x 768 pixels or higher for optimum viewing of NMS screens.

4.3 Hype Terminal operation mode

Check the connectivity of the RS-232 cable from your computer to the console port of SNMP card.
Run the terminal emulation program such as Hyper Terminal with the following setting:

Emulation: VT-100 compatible

Band rate: 115200, Data bits: 8, Parity: None, Stop Bits: 1, Flow Control: None



The main menu :

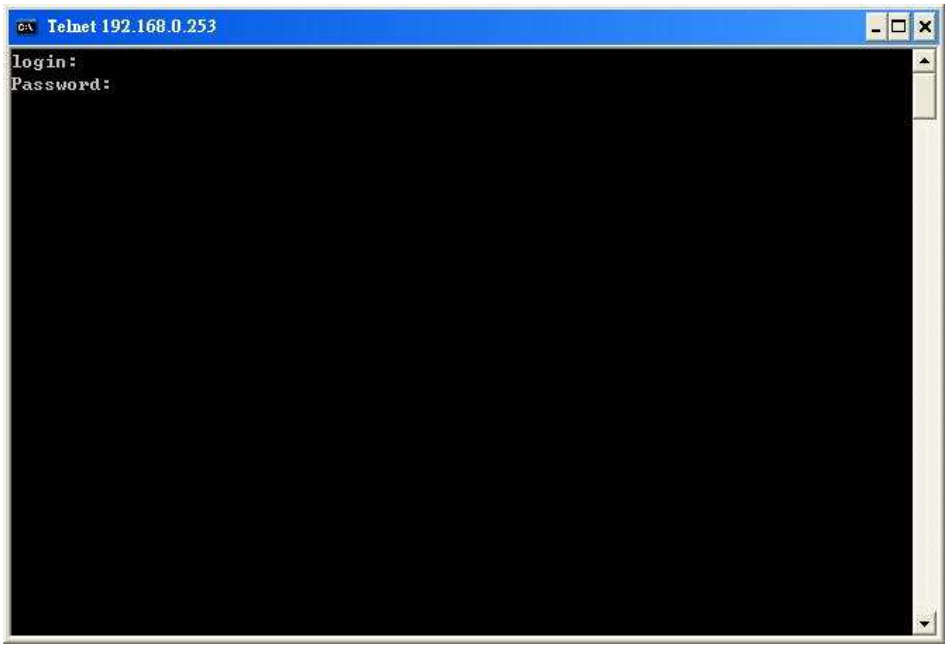
```
Procend,Core Version <<1.00.22>>  00:00 1999-11-30
Command Line Interface for Rack Mount System 192.168.0.80

############################################################
###################    MAIN MENU    ###################

 1. Card Info
 2. Show Card Configutation
 3. Show Card Status
 4. System Info
 5. Upgrade
 6. Channel Setup
 0. Exit

 Enter Value:
```

Their display screen are same as Telnet mode. Please refer to the chapter of Telnet operation mode.

4.4 Telnet operation mode

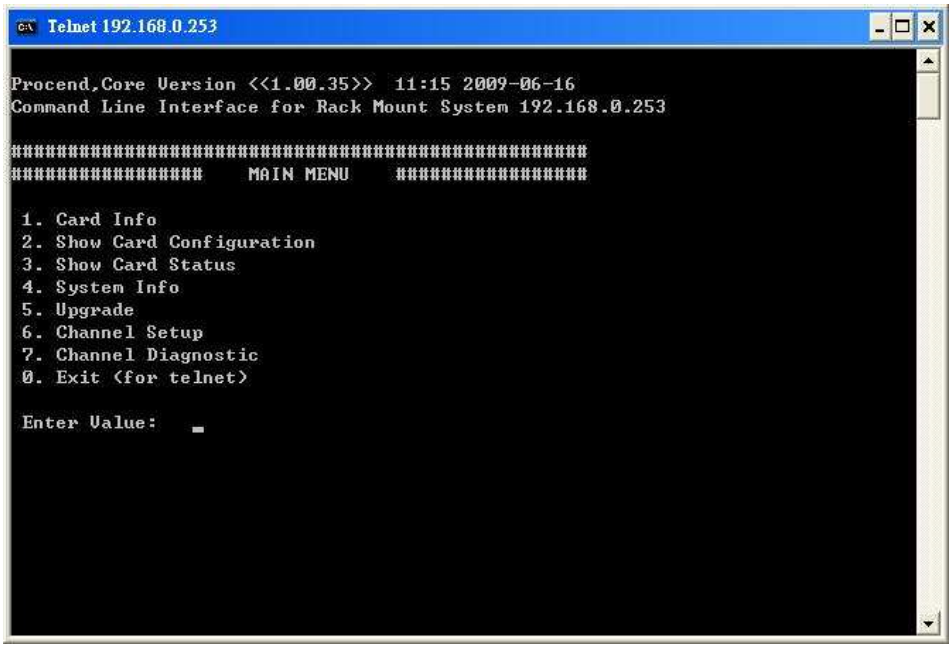
Make sure the correct Ethernet cable connected the SNMP card of the system. The LAN LNK LED indicator on the front panel shall light if a correct cable is used. Starting your Telnet client with VT100 terminal emulation and connecting to the management of SNMP, wait for the login prompt appears. Input User and Password after login screen pop up.

The default username is “**admin**”. When password request, press ENTER key.



4.4.1 Main menu

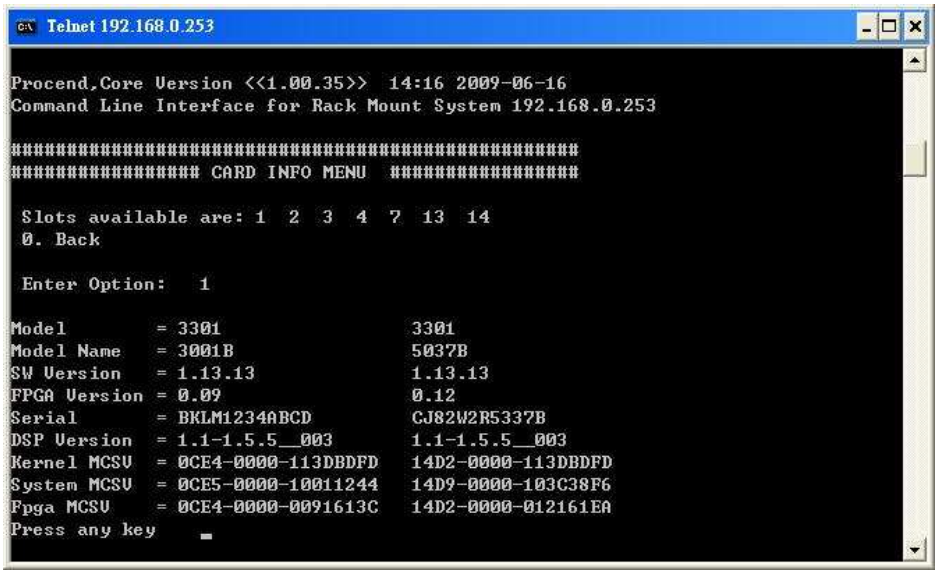
The NMS main window appears upon login:



The Sub-Menu are the following:

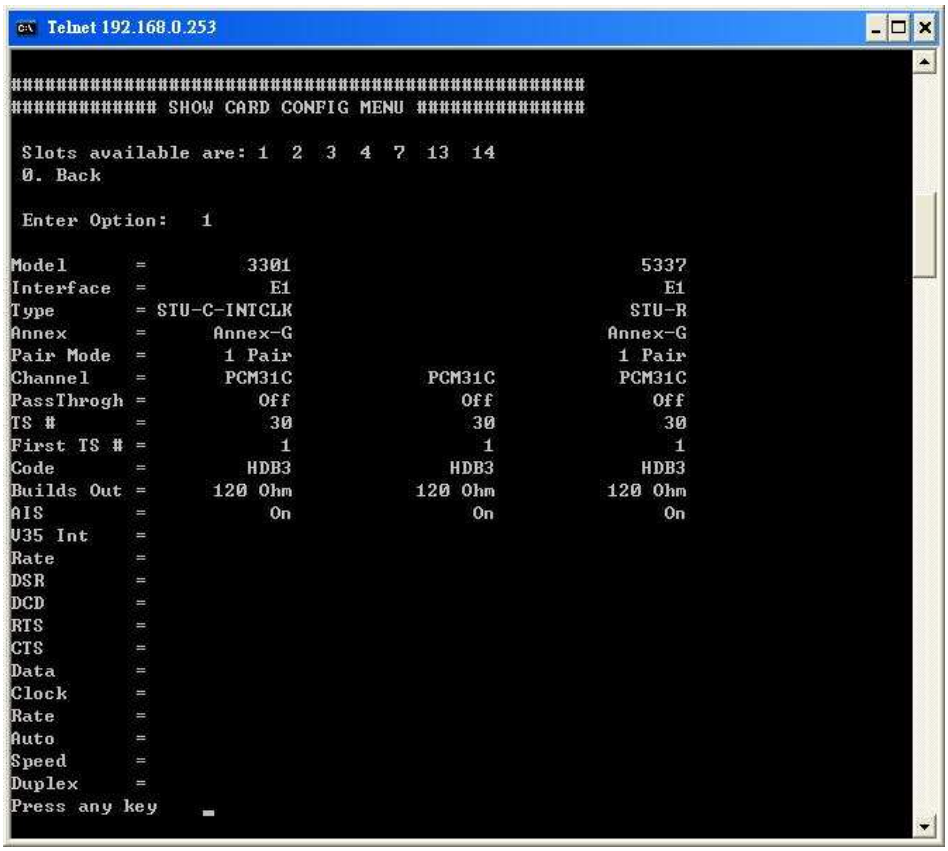
1. Card Info
2. Show Card Configuration
3. Show Card Status
4. System Info
5. Upgrade
6. Channel Setup
7. Channel Diagnostic
0. Exit

4.4.2 Card Info


Telnet 192.168.0.253
Procend,Core Version <<1.00.35>> 14:16 2009-06-16
Command Line Interface for Rack Mount System 192.168.0.253
CARD INFO MENU
Slots available are: 1 2 3 4 7 13 14
0. Back
Enter Option: 1
Model = 3301 3301
Model Name = 3001B 5037B
SW Version = 1.13.13 1.13.13
FPGA Version = 0.09 0.12
Serial = BKLM1234ABCD CJ82W2R5337B
DSP Version = 1.1-1.5.5__003 1.1-1.5.5__003
Kernel MCSV = 0CE4-0000-113DBDFD 14D2-0000-113DBDFD
System MCSV = 0CE5-0000-10011244 14D9-0000-103C38F6
Fpga MCSV = 0CE4-0000-0091613C 14D2-0000-012161EA
Press any key

The slots available number shows on top side meaning which slots of line card have installed.

4.4.3 Show Card Configuration



The first item “Model” is meaning the product ID of the devices. Refer the following table:

SHDSL.bis Line Card Series

Model number	Product ID
SHRM03b-E1	3300
SHRM03b-V35	3310
SHRM03b-ET100	3320
SHRM03b-T1	3305

SHDSL.bis NTU Series

Model name	Model number	Product ID
SHDTU03b-AC/2W/E1 SHDTU03b-DC/2W/E1 SHDTU03b-DA/2W/E1	5000B	5300
SHDTU03b-AC/2W/SER SHDTU03b-DC/2W/SER SHDTU03b-DA/2W/SER	5010B	5310
SHDTU03b-AC/2W/ETH SHDTU03b-DC/2W/ETH	5020B	5320

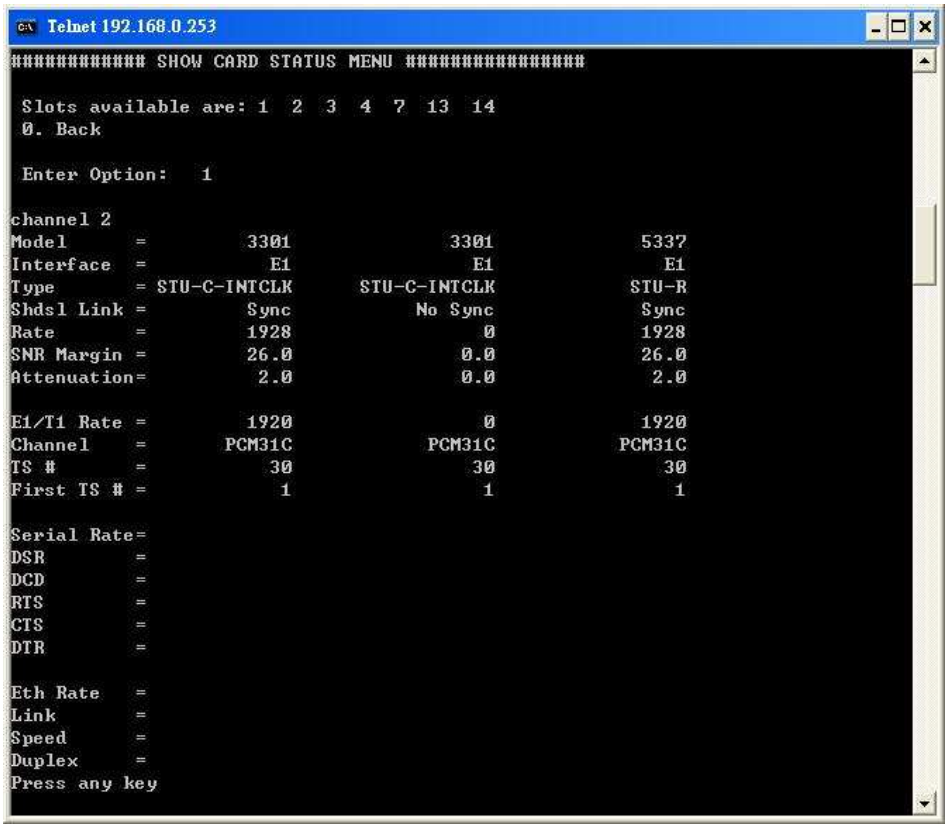
SHDTU03b-DA/2W/ETH		
SHDTU03b-AC/2W/E1/T1 SHDTU03b-DC/2W/E1/T1 SHDTU03b-DA/2W/E1/T1	5006B	5301
SHDTU03b-AC/2W/E1/SER/ETH SHDTU03b-DC/2W/E1/SER/ETH SHDTU03b-DA/2W/E1/SER/ETH	5030B	5330
SHDTU03b-AC/2W/E1/T1/SER/ETH SHDTU03b-DC/2W/E1/T1/SER/ETH SHDTU03b-DA/2W/E1/T1/SER/ETH	5036B	5336
SHDTU03b-AC/4W/E1 SHDTU03b-DC/4W/E1 SHDTU03b-DA/4W/E1	5001B	5305
SHDTU03b-AC/4W/SER SHDTU03b-DC/4W/SER SHDTU03b-DA/4W/SER	5011B	5315
SHDTU03b-AC/4W/ETH SHDTU03b-DC/4W/ETH SHDTU03b-DA/4W/ETH	5021B	5325
SHDTU03b-AC/4W/E1/T1 SHDTU03b-DC/4W/E1/T1 SHDTU03b-DA/4W/E1/T1	5007B	5306
SHDTU03b-AC/4W/E1/SER/ETH SHDTU03b-DC/4W/E1/SER/ETH SHDTU03b-DA/4W/E1/SER/ETH	5031B	5335
SHDTU03b-AC/4W/E1/T1/SER/ETH SHDTU03b-DC/4W/E1/T1/SER/ETH SHDTU03b-DA/4W/E1/T1/SER/ETH	5037B	5337

The display is same as following table:

Subject	Items	Local side Channel A	Local side Channel B	Remote side Channel A	Remote side Channel B
SHDSL.bis	Model Interface Type Annex Pair Mode				
E1	Channel Pass Through TS# First TS# Code Builds Out AIS				
Serial	V35 Int Rate DSR DCD RTS CTS Data Clock				

Ethernet	Rate Auto Speed Duplex				

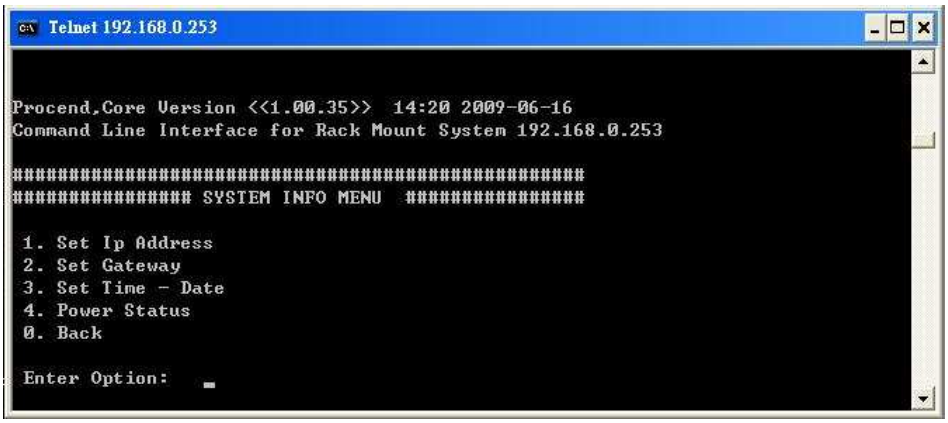
4.4.4 Show Card Status



The display is same as following table:

Subject	Items	Local side Channel A	Local side Channel B	Remote side Channel A	Remote side Channel B
Cards usage	Model Interface				
SHDSL.bis	Type Shdsl Link Rate SNR Margin Attenuation				
E1	Rate Channel TS# First TS#				
Serial	Serial Rate DSR DCD RTS CTS DTR				
Ethernet	Eth Rate Link Speed Duplex				

4.4.5 System Info



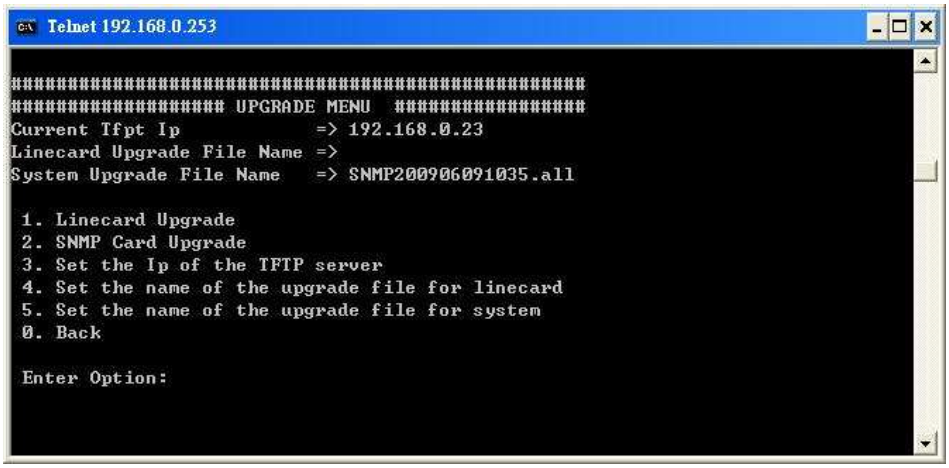
There have three basic setting on this menu:

1. IP Setup
2. Gateway Setup
3. Time and Date Setup

Power card status:

4. Power status

4.4.6 Upgrade


Telnet 192.168.0.253
##
#################### UPGRADE MENU ####################
Current Tfpt Ip   => 192.168.0.23
Linecard Upgrade File Name =>
System Upgrade File Name   => SNMP200906091035.all
1. Linecard Upgrade
2. SNMP Card Upgrade
3. Set the Ip of the TFTP server
4. Set the name of the upgrade file for linecard
5. Set the name of the upgrade file for system
0. Back
Enter Option:

For SNMP Card upgrade, type the following steps:

(1) Type 2 for setup TFTP IP

(2) Type 5 for setup upgrade file name

(3) Type 2 for SNMP card upgrade

For Line Cards upgrade, type the following steps:

(1) Type 2 for setup TFTP IP

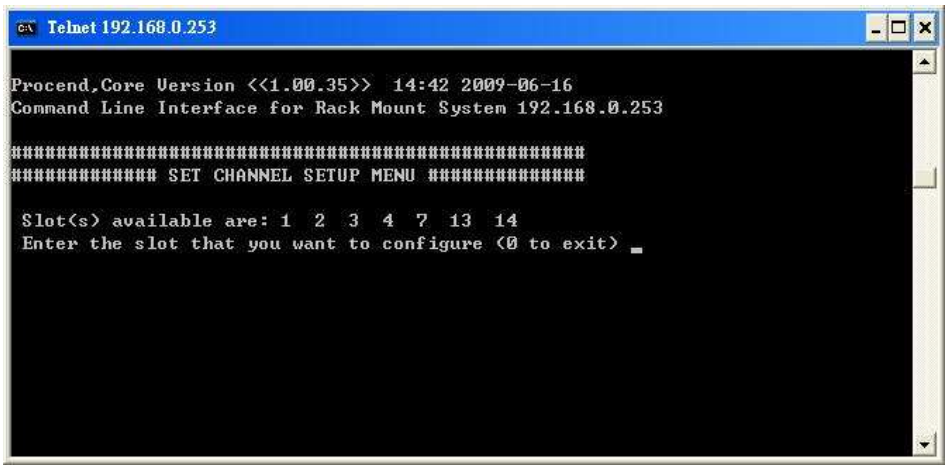
(2) Type 4 for setup upgrade file name

(3) Type 1 for line card upgrade

(4) Select which slot number to upgrade

(5) Select which channel: 1 – local side ; 2 – remote side channel A ; 3 – remote side channel B

4.4.7 Channel Setup

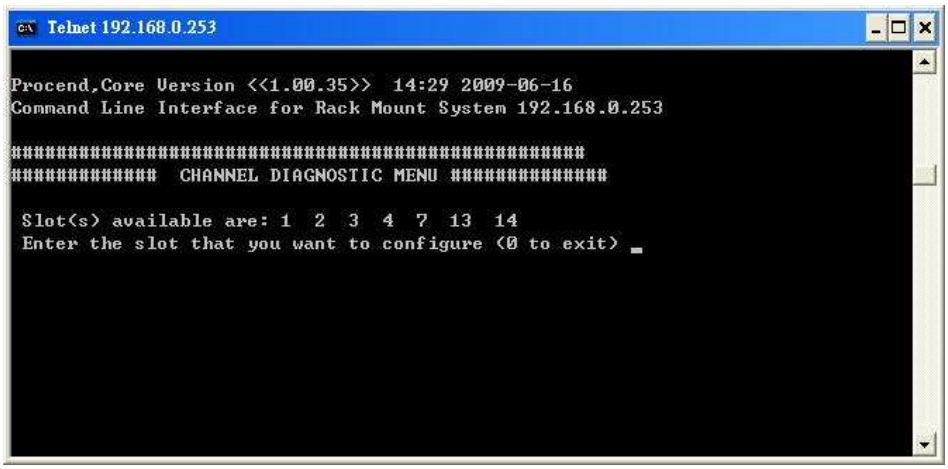

Telnet 192.168.0.253
Procend,Core Version <<1.00.35>> 14:42 2009-06-16
Command Line Interface for Rack Mount System 192.168.0.253
##
############## SET CHANNEL SETUP MENU ##############
Slot(s) available are: 1 2 3 4 7 13 14
Enter the slot that you want to configure (0 to exit)

Channel Diagnostic → Slot Number → Select Channel →

Channel 1 and 2 are means local side channel A and channel B

Channel 3 and 4 are means remote side channel A and channel B

4.4.8 Channel Diagnostic


Telnet 192.168.0.253
Procend,Core Version <<1.00.35>> 14:29 2009-06-16
Command Line Interface for Rack Mount System 192.168.0.253
CHANNEL DIAGNOSTIC MENU
Slot(s) available are: 1 2 3 4 7 13 14
Enter the slot that you want to configure (0 to exit)

Channel Diagnostic → Slot Number → Select Channel → Loopback →

- Disable
- Local Digital
- Local
- Rmt Line
- Rmt Payload

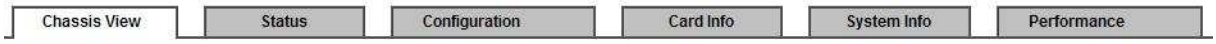
4.5 Web-based operation mode

4.5.1 Introduction

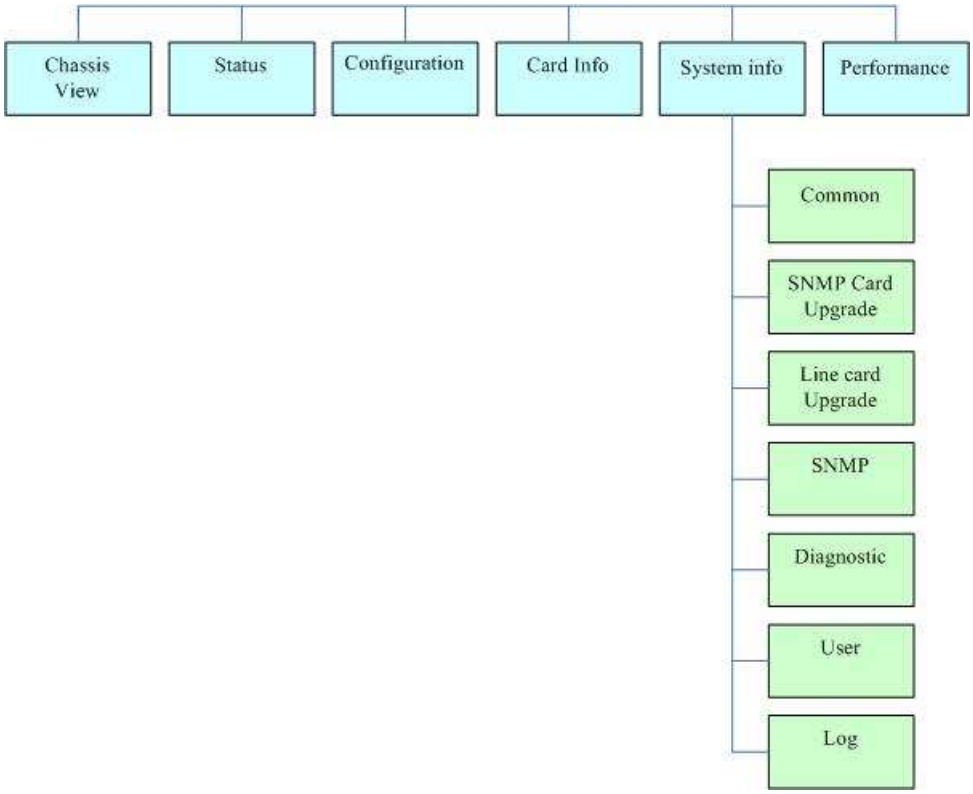
The SNMP card of rack mount system with SNMP feature included an embedded HTTP server. Once the TCP/IP settings are completed in the System Configuration of the SNMP via serial console, the unit can be accessed via TCP/IP using Telnet, SNMP, or HTTP (web browser). In the address bar of the web browser, enter 'http://' and the IP address of the SNMP agent.

4.5.2 Web Login

For security, the web based management requires a username and password to login. The default username is "**root**" and the password is "**root**" (the user level console terminal password).
When enter the system, you can view the menu bar on top side.

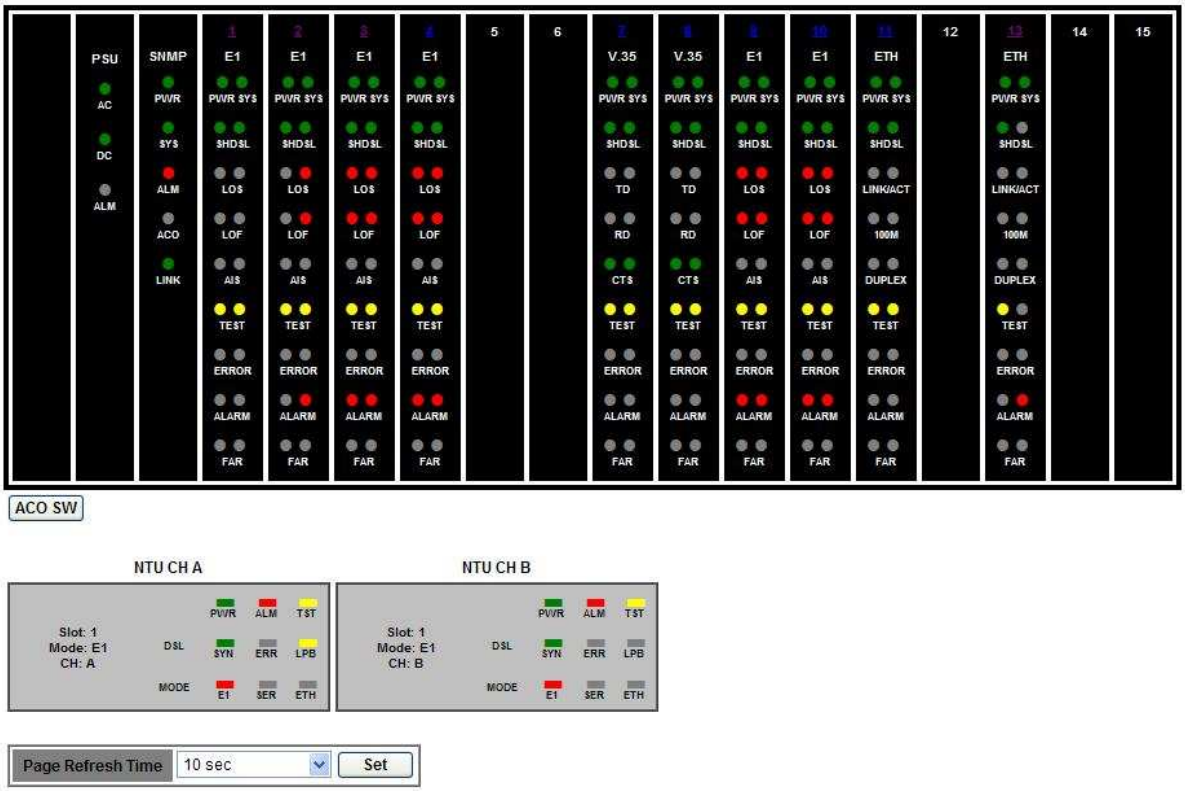


Menu Tree:



4.5.3 Chassis View

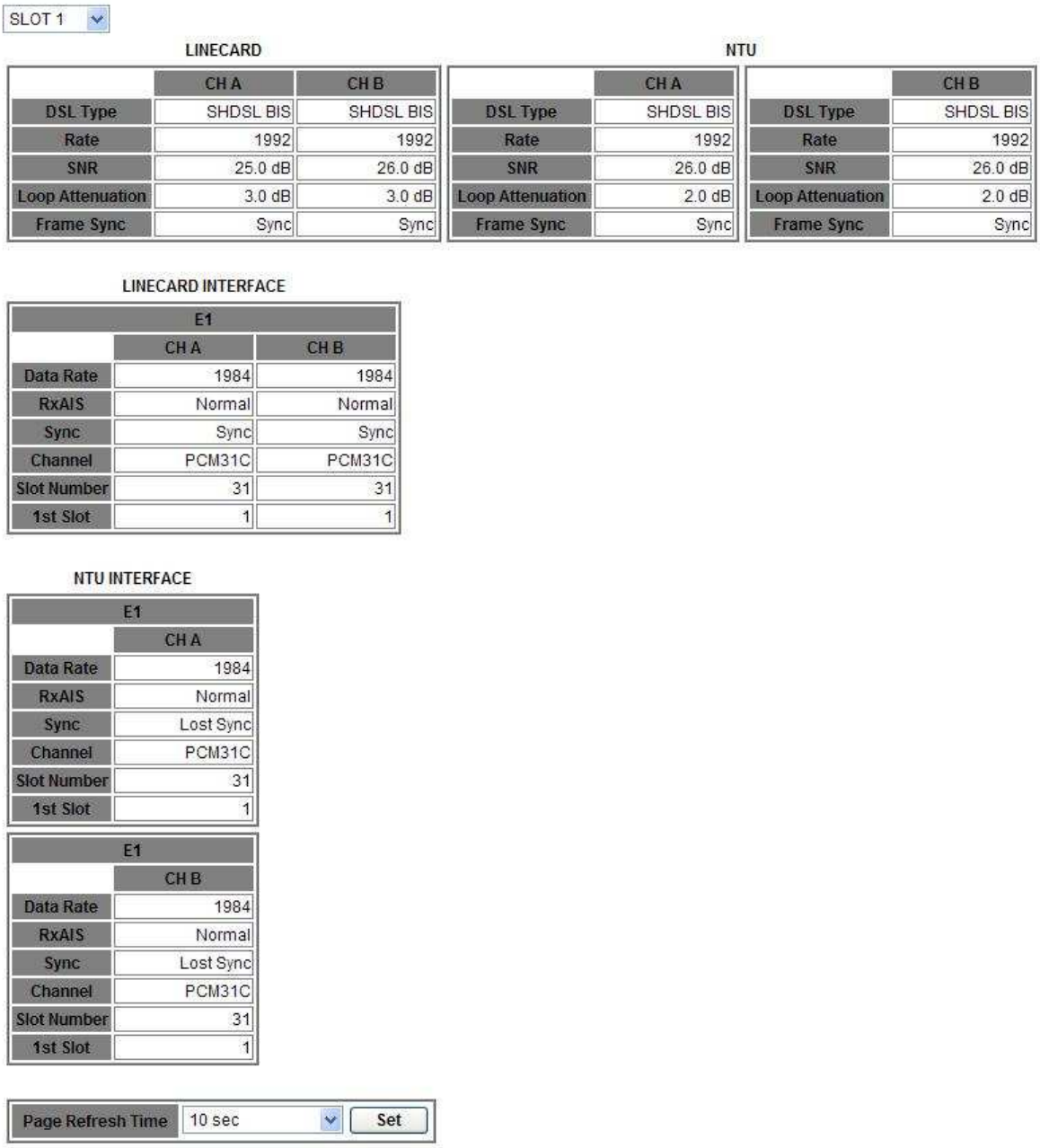
The initial page displayed after login will show an overview of the entire chassis. It named as "Chassis view" which have links to each individual line card, power card and SNMP card module. The LED state of all line cards is shown in real-time.



Using the browser interface, open the top menu by clicking the "Chassis View" and then clicking on the line card number you selected. You can view the channel (A and B) and both the CO (central) and RT (remote) devices' status. Click the "Set" button to setup the Page Refresh Time.

4.5.4 Status

Clicking the "Status" button and then selecting the appropriate line card number, a status screen will be displayed.

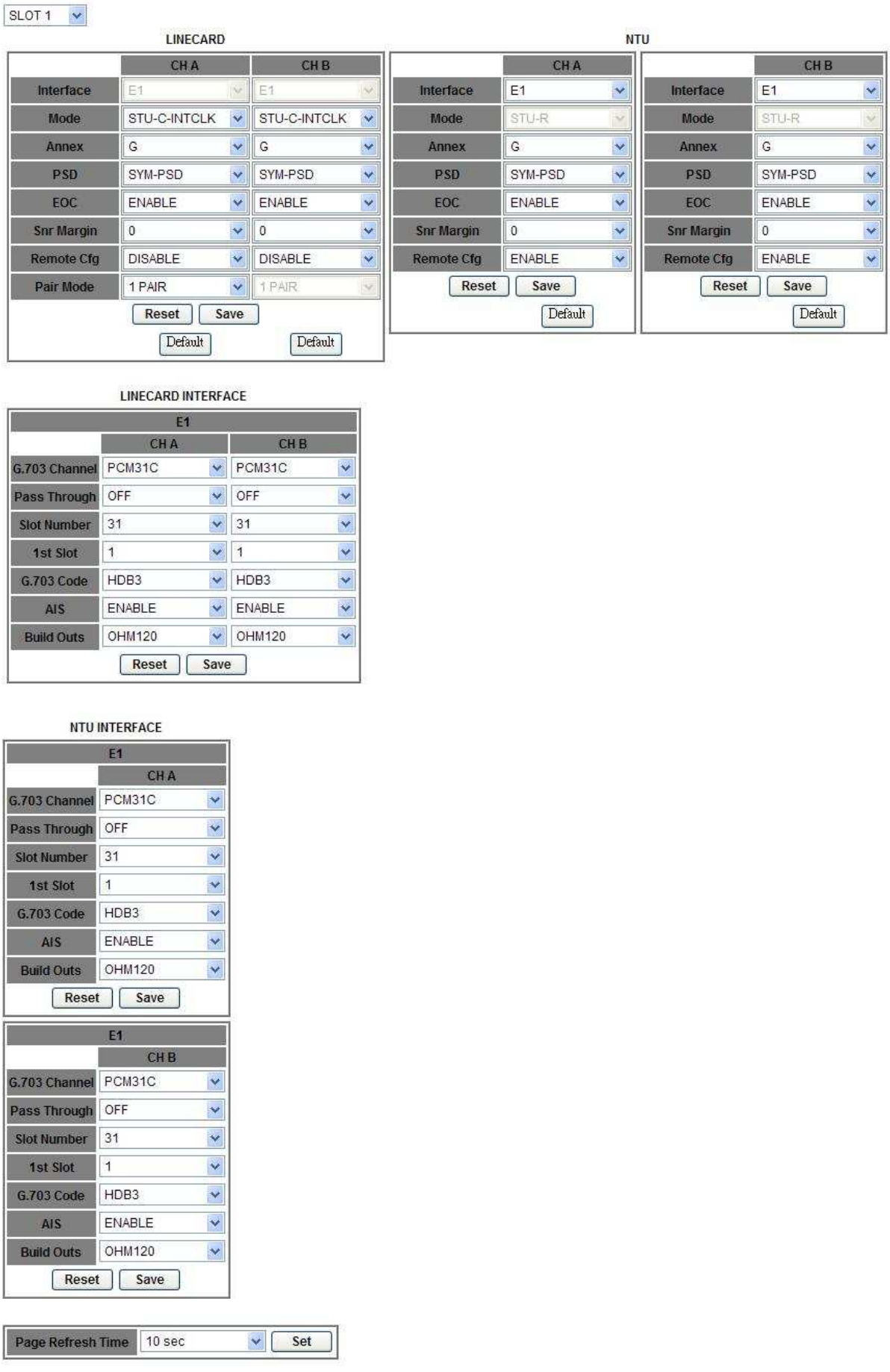


These items including SHDSL status and interface status on both local side(Line card) and remote side(NTU).
Click the "Set" button to setup the Page Refresh Time.

4.5.5 Configuration

By selecting the appropriate line card number, then clicking the "Configuration" button, a configuration selection will be displayed. The current values are shown; each parameter has a "pull-down" to select the available settings for that parameter. When all the parameter values are set to your liking, click the "Save" button and the values will be set in the line card or NTU

side. Click “Reset” button and the values will be set to default.



4.5.6 Card Info

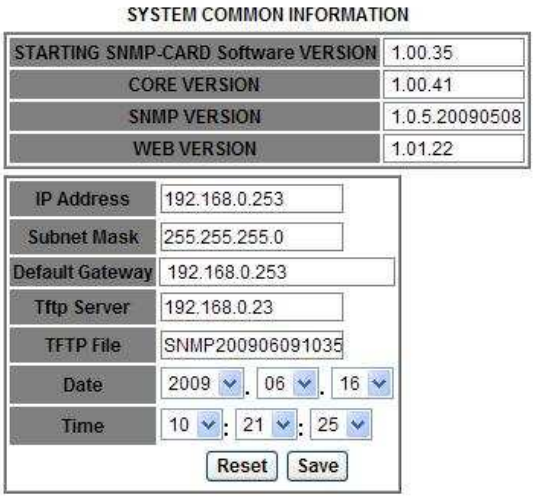
The item show the firmware information of each card.

4.5.7 System Info

This item is including system information, SNMP/Line card upgrade, diagnostic etc.

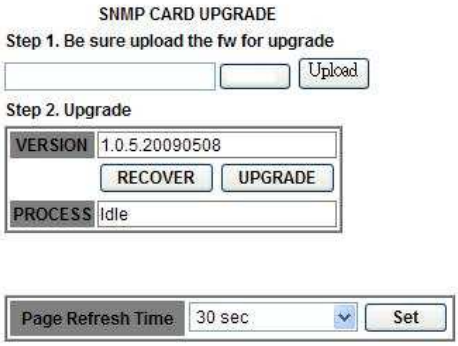
4.5.7.1 Common

This item show system information of SNMP card, user can also setup the parameter for SNMP card on here.



4.5.7.2 SNMP Card Upgrade

Use this function to upgrade the firmware on SNMP card.



4.5.7.3 Line card Upgrade

Use this function to upgrade the firmware on each line card (Local side) and remote side (NTU). User can also view the present version of firmware on these line cards and those NTUs.

LINECARD CARD UPGRADE

Step 1. Be sure upload the fw for upgrade

Upload

Step 2. Choose the slot need to be upgrade

Slot	Linecard	SW	FPGA	Progress
1	☐	1.13.13	0.09	Idle[0%]
2	☐	1.13.13	0.09	Idle[0%]
3	☐	1.13.13	0.09	Idle[0%]
4	☐	1.13.13	0.09	Idle[0%]
5				
6				
7	☐	1.13.01	0.09	Idle[0%]
8				
9				
10				
11				
12				
13	☐	1.13.13	0.09	Idle[0%]
14	☐	1.13.13	0.07	Idle[0%]
15				

LINECARD UPGRADE

Slot	NTU-A	SW	FPGA	Progress	NTU-B	SW	FPGA	Progress
1	☐	1.13.13	0.12	Idle[0%]				
2	☐	1.13.13	0.12	Idle[0%]				
3	☐	1.13.13	0.12	Idle[0%]	☐	1.13.13	0.12	Idle[0%]
4	☐	1.13.01	0.12	Idle[0%]				
5								
6								
7								
8								
9								
10								
11								
12								
13	☐	1.13.13	0.12	Idle[0%]				
14	☐	1.13.13	0.12	Idle[0%]	☐	1.13.13	0.12	Idle[0%]
15								

NTU UPGRADE

Page Refresh Time 30 sec Set

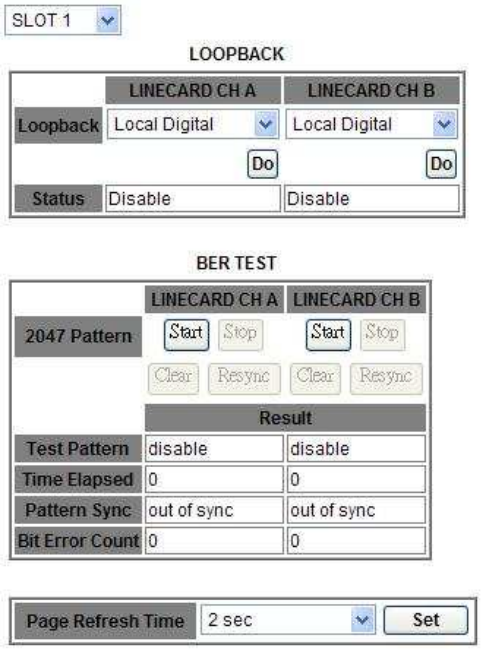
4.5.7.4 SNMP

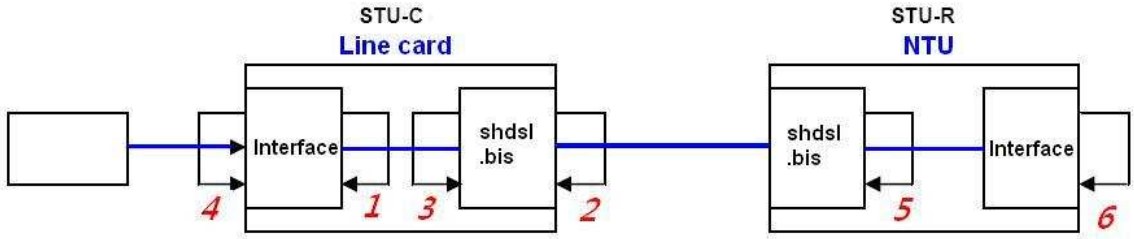
All SNMP parameter must setup on this item.

SNMP CARD STATUS / CONFIGURATION

Get community Passwd	public
Set community Passwd	private
Trap IP Address 1	192.168.0.42
Trap IP Address 2	192.168.1.243
Trap IP Address 3	192.168.0.23
SNMP Port	161
Trap Port	162
	Refresh Reset Save
Restart SNMP Agent	Restart

4.5.7.5 Diagnostic





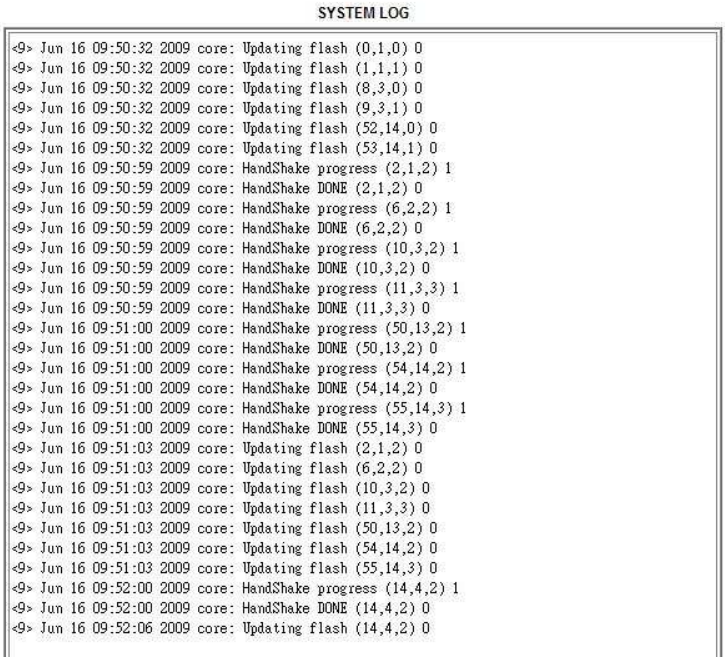
1 Local Digital Loopback
2 Local Loopback
3 Remote Line Loopback
4 Remote Payload Loopback
5 Far End Line Loopback
6 Far End Payload Loopback

4.5.7.6 User

By this item, user can modify the username and password.

4.5.7.7 Log

User can view the log file on this item.


SYSTEM LOG
<9> Jun 16 09:50:32 2009 core: Updating flash (0,1,0) 0
<9> Jun 16 09:50:32 2009 core: Updating flash (1,1,1) 0
<9> Jun 16 09:50:32 2009 core: Updating flash (8,3,0) 0
<9> Jun 16 09:50:32 2009 core: Updating flash (9,3,1) 0
<9> Jun 16 09:50:32 2009 core: Updating flash (52,14,0) 0
<9> Jun 16 09:50:32 2009 core: Updating flash (53,14,1) 0
<9> Jun 16 09:50:59 2009 core: HandShake progress (2,1,2) 1
<9> Jun 16 09:50:59 2009 core: HandShake DONE (2,1,2) 0
<9> Jun 16 09:50:59 2009 core: HandShake progress (6,2,2) 1
<9> Jun 16 09:50:59 2009 core: HandShake DONE (6,2,2) 0
<9> Jun 16 09:50:59 2009 core: HandShake progress (10,3,2) 1
<9> Jun 16 09:50:59 2009 core: HandShake DONE (10,3,2) 0
<9> Jun 16 09:50:59 2009 core: HandShake progress (11,3,3) 1
<9> Jun 16 09:50:59 2009 core: HandShake DONE (11,3,3) 0
<9> Jun 16 09:51:00 2009 core: HandShake progress (50,13,2) 1
<9> Jun 16 09:51:00 2009 core: HandShake DONE (50,13,2) 0
<9> Jun 16 09:51:00 2009 core: HandShake progress (54,14,2) 1
<9> Jun 16 09:51:00 2009 core: HandShake DONE (54,14,2) 0
<9> Jun 16 09:51:00 2009 core: HandShake progress (55,14,3) 1
<9> Jun 16 09:51:00 2009 core: HandShake DONE (55,14,3) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (2,1,2) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (6,2,2) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (10,3,2) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (11,3,3) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (50,13,2) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (54,14,2) 0
<9> Jun 16 09:51:03 2009 core: Updating flash (55,14,3) 0
<9> Jun 16 09:52:00 2009 core: HandShake progress (14,4,2) 1
<9> Jun 16 09:52:00 2009 core: HandShake DONE (14,4,2) 0
<9> Jun 16 09:52:06 2009 core: Updating flash (14,4,2) 0

4.5.8 Performance

There have many performance data can view. The time interval used 15 minute and 24 hour(one days).

The items include:

15 minute interval:

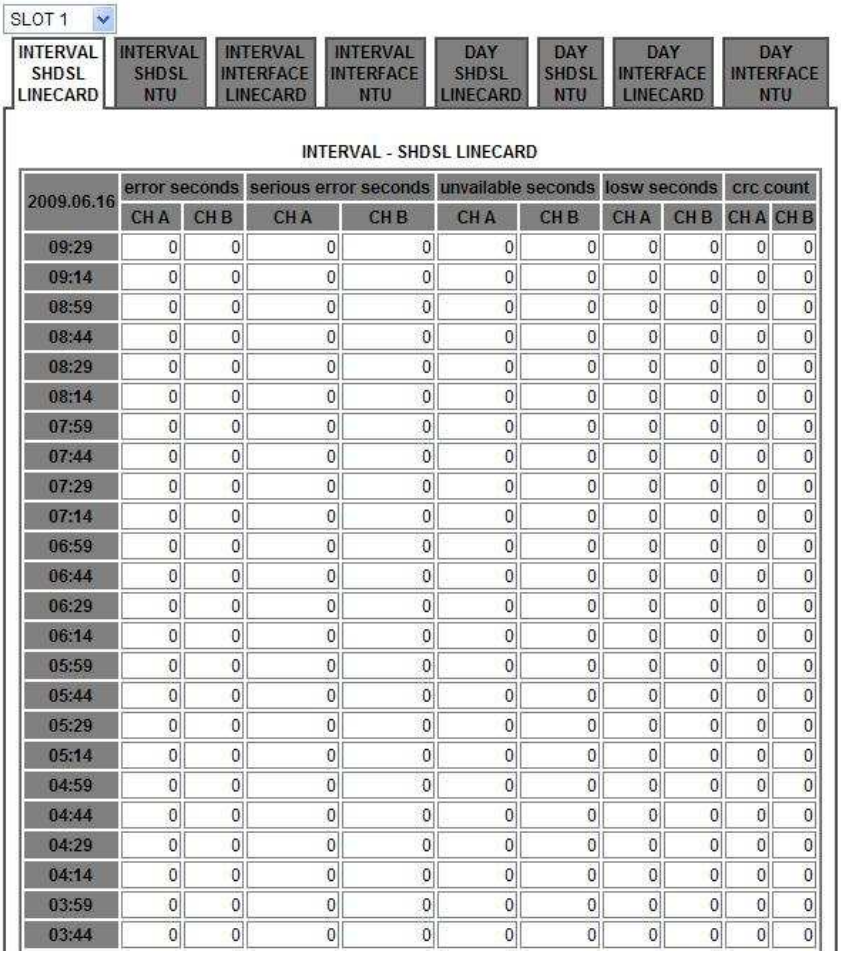
- SHDSL data for Line card and NTU
- INTERFACE data for Line card and NTU (for E1 and T1 interface only)

24 hour interval:

- SHDSL data for Line card and NTU
- INTERFACE data for Line card and NTU (for E1 and T1 interface only)

Models vs. performance data support:

	SHRM03bB	SHRM03b-V35	SHRM03b-ET100	SHRM03b-T1
15 min SHDSL line card	●	●	●	●
15 min SHDSL NTU	●	●	●	●
15 min INTERFACE line card	●			●
15 min INTERFACE NTU	●			●
24 hr SHDSL line card	●	●	●	●
24 hr SHDSL NTU	●	●	●	●
24 hr INTERFACE line card	●			●
24 hr INTERFACE NTU	●			●



2009.06.16	error seconds		serious error seconds		unvailable seconds		losw seconds		crc count	
	CH A	CH B	CH A	CH B	CH A	CH B	CH A	CH B	CH A	CH B
09:29	0	0	0	0	0	0	0	0	0	0
09:14	0	0	0	0	0	0	0	0	0	0
08:59	0	0	0	0	0	0	0	0	0	0
08:44	0	0	0	0	0	0	0	0	0	0
08:29	0	0	0	0	0	0	0	0	0	0
08:14	0	0	0	0	0	0	0	0	0	0
07:59	0	0	0	0	0	0	0	0	0	0
07:44	0	0	0	0	0	0	0	0	0	0
07:29	0	0	0	0	0	0	0	0	0	0
07:14	0	0	0	0	0	0	0	0	0	0
06:59	0	0	0	0	0	0	0	0	0	0
06:44	0	0	0	0	0	0	0	0	0	0
06:29	0	0	0	0	0	0	0	0	0	0
06:14	0	0	0	0	0	0	0	0	0	0
05:59	0	0	0	0	0	0	0	0	0	0
05:44	0	0	0	0	0	0	0	0	0	0
05:29	0	0	0	0	0	0	0	0	0	0
05:14	0	0	0	0	0	0	0	0	0	0
04:59	0	0	0	0	0	0	0	0	0	0
04:44	0	0	0	0	0	0	0	0	0	0
04:29	0	0	0	0	0	0	0	0	0	0
04:14	0	0	0	0	0	0	0	0	0	0
03:59	0	0	0	0	0	0	0	0	0	0
03:44	0	0	0	0	0	0	0	0	0	0

4.6 Problems and Solutions

The following sections describe problems you may encounter in using the NMS.

PC Cannot Locate Web Server

The PC being used to access NMS keeps a record of IP (Internet Protocol) and MAC (Medium Access Control) addresses in its local ARP (Address Resolution Protocol) cache. If the same computer is used to access NMS through the local management port and then again to access NMS through a network connection, the local ARP cache can prevent the computer from "finding" the embedded web server. Though the ARP cache will eventually clear itself as entries time out, it can also be cleared manually:

1. Click on the Windows Start button.
2. Select Run.
3. Type **cmd** and click on OK to open a command prompt.
4. At the prompt, type
   arp -a
   and press the Enter key.
   This will return a list of all the IP Addresses in the computer's ARP cache.
5. If the IP address you wish to clear is listed, type:
   arp -d [the IP Address]
   at the prompt and press the Enter key.

Web Pages Are Loading Slowly

If NMS pages are accessible but refreshing slowly, close all browser windows and
re-launch the application. If the problem continues, you may be encountering one
of the following conditions:

1. Too Many Users – NMS can supports up more users simultaneously. But the system may experience a slowdown if there are so many users at a time. Likewise, new users cannot log in at the same time. Please attempt later if some user logout.
2. Inband Connection Speed not set appropriately – The speed setting may need to be increased if you are accessing the system via an inband connection from a remote customer site (e.g., through a provisioned SHDSL connection). As an example, a 128 kbps DSL connection is generally sufficient for NMS access although it is possible for heavy traffic to cause

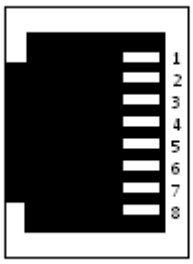
delays when downloading a web page.

3. Network Congestion – Extensive network congestion may impact NMS performance due to the fact that the embedded web server powering NMS is a TCP/IP device. Under heavy congestion, you will notice most other network tasks experiencing a slowdown as well.

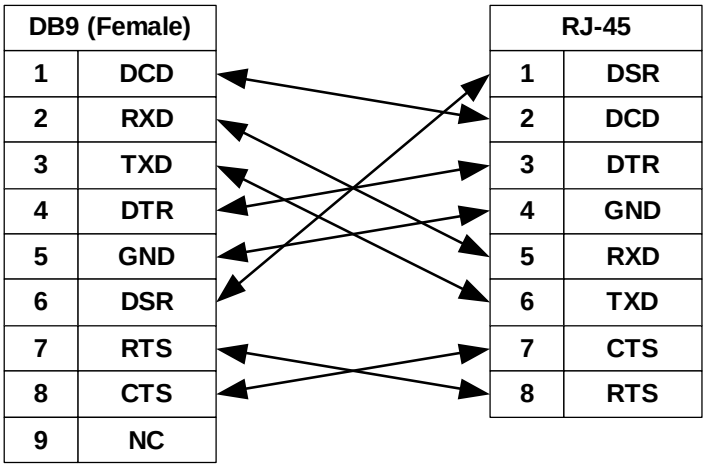
5 Appendix

5.1 Console Cable

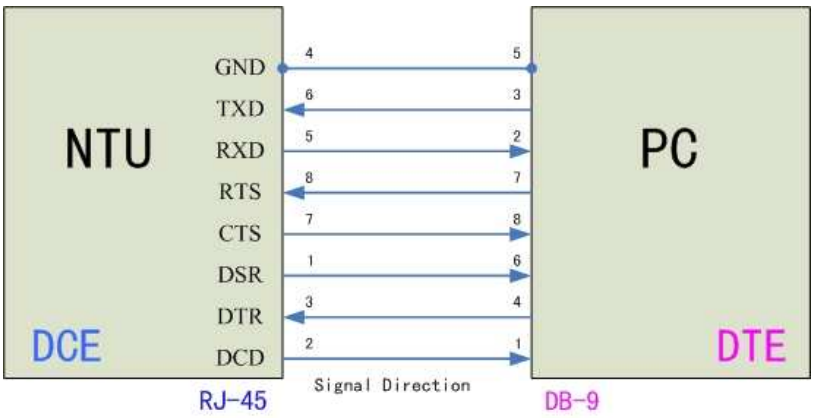
The front view of RJ-45 console cable socket on front panel:



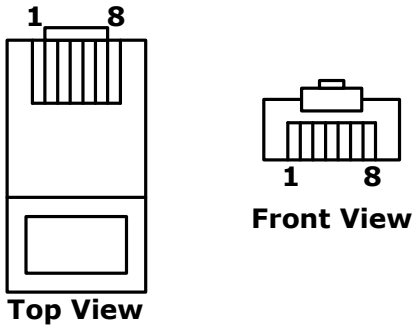
The wire connection of console cable DB-9(Female) to RJ-45:



The signal direction of console cable:



The pin assignment of RJ-45 modular jack on the console cable:

Pin Number	Abbrev.	Description	Figure
1	DSR	DCE ready	
2	DCD	Received Line Signal Detector	
3	DTR	DTE ready	
4	GND	Signal Ground	
5	RXD	Received Data	
6	TXD	Transmitted Data	
7	CTS	Clear to Send	
8	RTS	Request to Send	

5.2 Serial Interface Pin Assignments

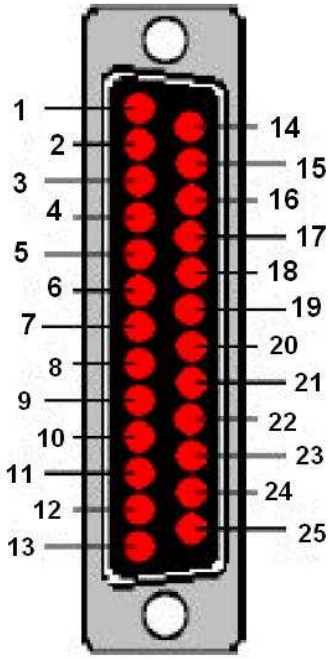
The table below displays Serial Interface Pin Assignments for the DCE Mode

.

Function	Abbrev.	Direction	RS-530 DB-25(F)	V.35 M.34(F)	X.21 DB-15(F)
Frame Ground	FG	N/A	1	A	1
Transmit Data	TD	Input	2	P	2
Receive Data	RD	Output	3	R	4
Request to Send	RTS	Input	4	C	3
Clear to Send	CTS	Output	5	D	
Data Set Ready	DSR	Output	6	E	
Signal Ground	SG	N/A	7	B	8
Data Carrier Detect	DCD	Output	8	F	5
Secondary Receiver Clock	(S)RC	Output	9	X	13
Secondary Data Carrier Detect	(S)DCD	Output	10		12
Secondary External Transmitter Clock	(S)ETC	Input	11	W	7
Secondary Transmitter Clock	(S)TC	Output	12	AA	
Secondary Clear to Send	(S)CTS	Output	13		
Secondary Transmit Data	(S)TD	Input	14	S	9
Transmitter Clock	TC	Output	15	Y	
Secondary Receive Data	(S)RD	Output	16	T	11
Receiver Clock	RC	Output	17	V	6
Local Loopback			18		
Secondary Request to Send	(S)RTS	Input	19		10
Data Terminal Ready	DTR	Input	20	H	
Remote Loopback			21		
Secondary Data Set	(S)DSR	Output	22		

Ready					
Secondary Data Terminal Ready	(S)DTR	Input	23		
External Transmitter Clock	ETC	Input	24	U	14
Test Indicator			25		

The front view of DB-25(F) Serial interface connector on rear panel:



DB-25(F) Connector

5.3 E1 Unbalanced Cable

Connections to the E1 BNC ports are made using a 75-ohm coaxial cable with a bayonet-style twist-lock BNC connector.

The front view of BNC sockets on rear panel:

The internal wiring between BNC sockets and RJ-48C:

Signal Name	BNC Connecters	RJ-48C Connector
Transmit Tip	Center pin of Tx Connector	5
Transmit Ring	Shield of Tx Connector	4
Receive Tip	Center pin of Rx Connector	2
Receive Ring	Shield of Rx Connector	1

5.4 V.35 DB25(M) to M.34(F) adaptor Cable

If the DTE (Data Terminal Equipment) connector is using 34-pin Winchester type, we must use the cable adaptor from DB-25 to Winchester (M.34).

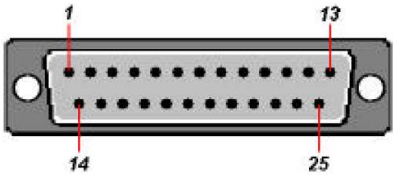
The pin out of cable on DB-25(male) Connector to M.34(female) Connector:

DB-25 Pin	Signal	M.34 Pin	Description
2	TD	P	Transmit Data
14	TD	S	Transmit Data
3	RD	R	Receive Data
16	RD	T	Receive Data
4	RTS	C	Ready To Send
5	CTS	D	Clear To Send
6	DSR	E	Data Set Ready
20	DTR	H	Data Terminal Ready
24	XTC	U	DTE Transmit Clock
11	XTC	W	DTE Transmit Clock
15	TC	Y	Transmit Clock
12	TC	AA	Transmit Clock
17	RC	V	Receive Clock
9	RC	X	Receive Clock
1	FGND	A	Protective Ground
7	GND	B	Signal Ground
8	DCD	F	Data Carrier Detect

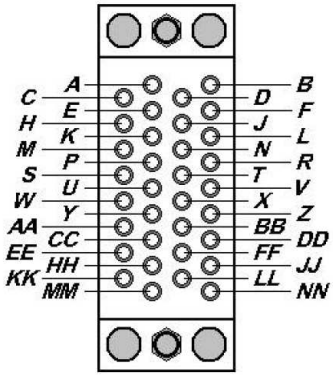
V.35 is a partially balanced, partially single-ended interface specification. The data leads and clock leads are balanced; the handshake leads are single-ended.
TD, RD, TC, RC and XTC are differential signals conforming to RS-422/V.11. Remaining control and handshake signals (RTS, CTS, DSR and DTR) are conformed to RS-232 as unbalanced.

The front view of DB-25(M) connector and V.35(F) connector on this

cable:



DB-25(M) connector



M.34(F) connector

V.35 interface (34-pin Winchester type) contains the following signals:

Pin	Signal	Abbr.	DTE	DCE
A	Chassis Ground	FGND	---	---
B	Signal Ground	GND	---	---
C	Request To Send	RTS	Out	In
D	Clear To Send	CTS	In	Out
E	Data Set Ready	DSR	In	Out
F	Data Carrier Detect	DCD	In	Out
H	Data Terminal Ready	DTR	Out	In
J	Unassigned			
K	Unassigned			
L	Unassigned			
M	Unassigned			
N	Unassigned			
P	Send Data A	SD(A)	Out	In
R	Receive Data A	RD(A)	In	Out
S	Send Data B	SD(B)	Out	In
T	Receive Data B	RD(B)	In	Out
U	Terminal Timing A	SCTE(A)	Out	In
V	Receive Timing A	SCR(A)	In	Out
W	Terminal Timing B	SCTE(B)	Out	In
X	Receive Timing B	SCR(B)	In	Out
Y	Send Timing A	SCT(A)	In	Out
Z	Unassigned			
AA	Send Timing B	SCT(B)	In	Out
BB	Unassigned			
CC	Unassigned			
DD	Unassigned			
EE	Unassigned			
FF	Unassigned			
HH	Unassigned			
JJ	Unassigned			
KK	Unassigned			
LL	Unassigned			
MM	Unassigned			

NN	Unassigned

5.5 X.21 DB25(M) to DB15(F) adaptor Cable

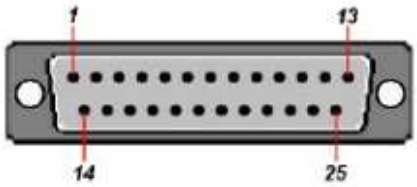
For X.21 application, we must use the DB-25 to DB-15 adaptor cable for connects to a X.21 DTE DB-15 male cable.

The pin out of cable on DB-25(male) Connector to DB-15(Female) (X.21) Connector

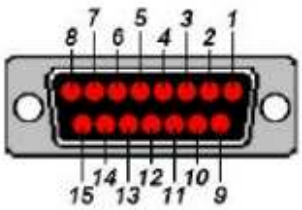
DB-25 Pin	Signal	DB-15 (X.21) Pin	Description
1	FGND	1	Protective Ground
7	GND	8	Signal Ground
2	T	2	Transmit Data
14	T	9	Transmit Data
3	R	4	Receive Data
16	R	11	Receive Data
4	C	3	Request To Send
19	C	10	Request To Send
8	I	5	Data Carrier Detect
10	I	12	Data Carrier Detect
17	S	6	Receive Clock
9	S	13	Receive Clock

All signals are balanced. Meaning there is always a pair (+/-) for each signal, like used in RS422. The X.21 signals are the same as RS422, so please refer to RS422 for the exact details.

The front view of DB-25(M) connector and DB-15(F) connector on this cable:



DB-25(M) Connector



DB-15(F) Connector

The pin out of DB-15 connector on X.25 adaptor cable:

Pin	Signal	Abbr.	DTE	DCE
1	Shield	--	--	--
2	Transmit (A)	TA	Out	In
3	Control (A)	CA	Out	In
4	Receive (A)	RA	In	Out
5	Indication (A)	IA	In	Out
6	Signal Timing (A)	SA	In	Out
7	Unassigned			
8	Ground	--	--	--
9	Transmit (B)	TB	Out	In
10	Control (B)	CB	Out	In
11	Receive (B)	RB	In	Out
12	Indication (B)	IB	In	Out
13	Signal Timing (B)	SB	In	Out
14	Unassigned			
15	Unassigned			

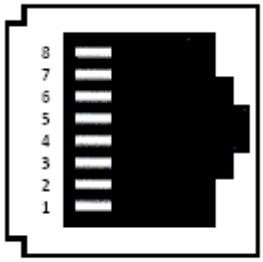
Functional Description:

The Signal Element Timing (clock) (S) is provided by the DCE. This means that the NTU is output the correct clocking and that X.21 is a synchronous interface. Hardware handshaking is done by the Control (C) and Indication (I) lines. The Control is used by the DTE and the Indication is the DCE one.

5.6 Ethernet cable

The Ethernet cables should be 4 pair unscreened cable (UTP) or screened (STP) of type CAT5 (or higher). Both crossed and normal wiring styles are supported by the auto-crossover feature of the Line card.
We do not provide the cable. It is widely available from other sources.

The front view of RJ-45 Ethernet cable socket on rear panel:



The pin out of RJ-45 Ethernet Connector:

Pin number	Signal Name
1	Transmit Data **+**
2	Transmit Data **-**
3	Receive Date **+**
4	Not used
5	Not used
6	Receive Date **-**
7	Not used
8	Not used

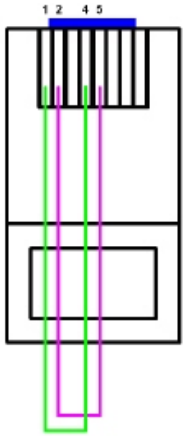
5.7 Illustration of Loopback connection device (E1)

RJ-48C Pin number	Description
4	Transmit Ring
3	Rx Shield
1	Receive Ring
6	TX Shield
5	Transmit Tip
2	Receive Tip

Make the short circuit/wiring with a RJ-45 module jack of the following:

PIN1←----→PIN4
PIN2 ←----→PIN5

The top view of RJ-45 module jack on short circuit/wiring:



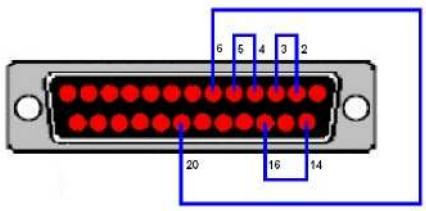
5.8 Illustration of Loopback connection device (Serial)

DB-25(M) Pin number	Signal	Description
2	TD(A)	Transmit Data
14	TD(B)	Transmit Data
3	RD(A)	Receive Data
16	RD(B)	Receive Data
4	RTS	Ready To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
20	DTR	Data Terminal Ready
24	XTC	DTE Transmit Clock
11	XTC	DTE Transmit Clock
15	TC(A)	Transmit Clock
12	TC(B)	Transmit Clock
17	RC(A)	Receive Clock
9	RC(B)	Receive Clock
1	FGND	Protective Ground
7	GND	Signal Ground
8	DCD	Data Carrier Detect

Make the short circuit/wiring with a DB-25(male) connector of the following:

PIN2 ←----→PIN3
PIN14←---→PIN16
PIN4 ←----→PIN5
PIN6 ←---→PIN20

The back side view of DB-15(male) connector on short circuit/wiring:



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